

MARCH, 1925

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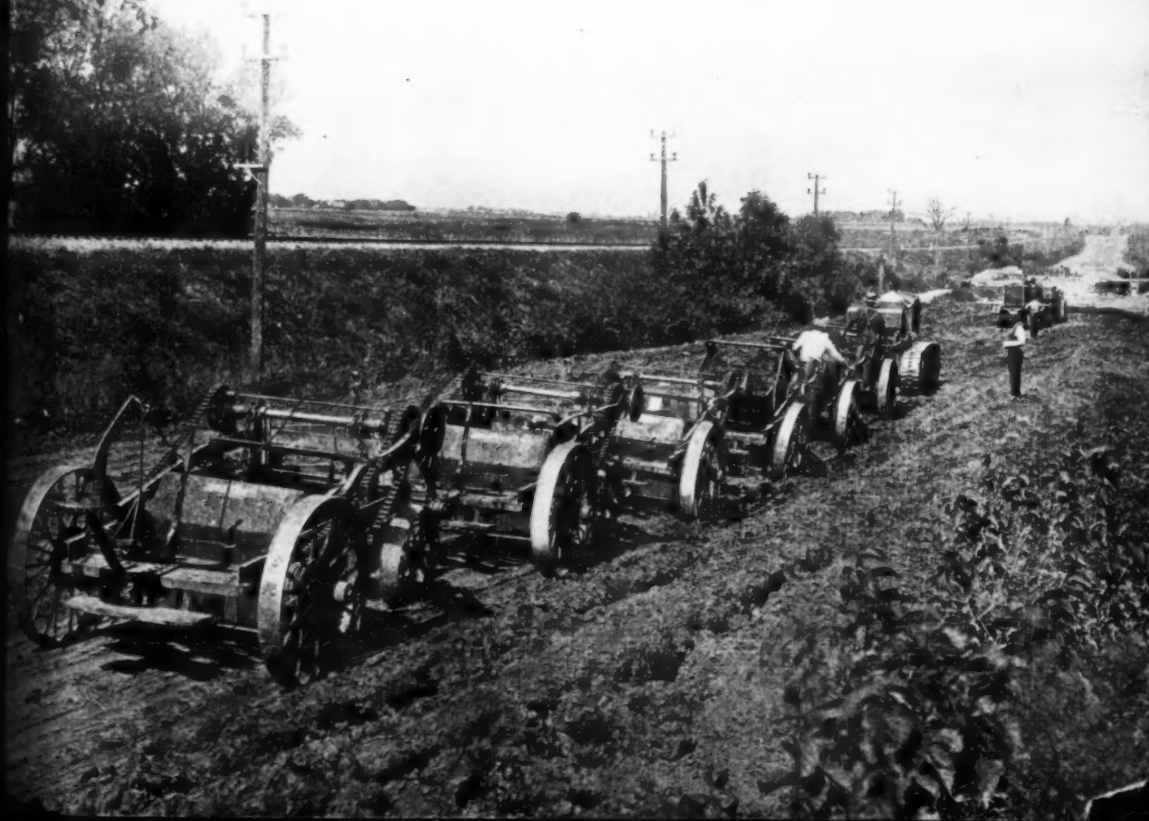
25 Cents

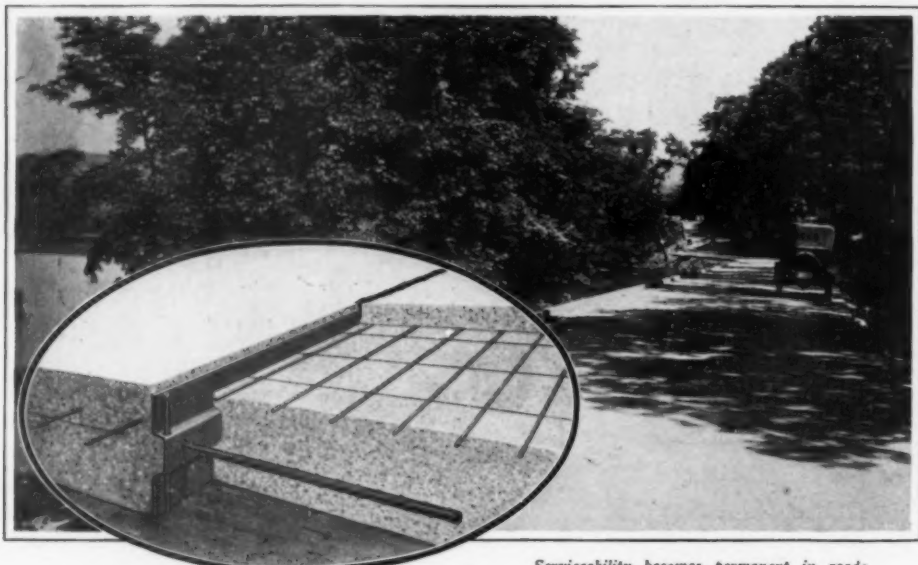
\$1 a Year

Contractors' *and* Engineers' Monthly

THE JOHN CRerar
MAR 25 1925
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Grading Operations
on Northern Illinois
Road Job
(See Page 84)





Note the square shoulder of the Truscon Contraction Joint. This preserves surface alignment of slabs.

Serviceability becomes permanent in roads built with Truscon Wire Mesh and Contraction Joints.



Truscon Wire Mesh comes in flat sheets ready to apply, easily and economically handled.



Truscon Wire Mesh may also be used in rolls. The simplicity of application is shown above.

Insure Your Roadways

Truscon Wire Mesh and Contraction Joints insure roadways against the most serious factors of road deterioration.—severe traffic and weather. Truscon Wire Mesh, a rigid sheet of electrically welded reinforcing, binds the concrete slab solidly to resist the unusual stresses of motorized modern traffic. It comes in flat sheets ready for easy application, doing away with cutting. It is insurance of permanence.

The Truscon Contraction Joint is used to form a line of breakage into which cracking due to expansion and contraction can be guided. The one crack is easily filled later, any bituminous substance being employed.

TRUSCON STEEL CO., Youngstown, O.

Warehouses and Sales Offices from Pacific to Atlantic. For addresses see 'phone books of principal cities. Canada: Walkerville, Ont. Foreign Div.: New York.

TRUSCON
WIRE MESH AND
CONTRACTION JOINTS

Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment.



The Index to Advertisers faces the inside back cover. When writing to advertisers please mention the **CONTRACTORS' & ENGINEERS' MONTHLY**. A star (*) before the manufacturer's name indicates that his advertisement appears in this issue.

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- Weller Mfg. Co., Chicago, Ill.

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- *Barrett Co., New York.
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- Cumner & Son Co., F. D., Cleveland, O.
- Farasey Co., J. D., Cleveland, Ohio.
- Hetherington & Berner, Indianapolis, Ind.

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- *Aeroll Burner Co., Union Hill, N. J.
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- Hauck Mfg. Co., Brooklyn, N. Y.

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- *Byers Machine Co., Ravenna, Ohio.
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- McKenna Co., Cleveland, Ohio.
- Ransome Concrete Mch. Co., Dunellen, N. J.

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- Concrete Steel Co., New York.
- Universal Form Clamp Co., Chicago, Ill.

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* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.

KOEHRING



Crowds Above and Beyond end of Boom!

AS the Koehring shovel digs itself down, the Koehring crowding action still permits high truck loading! Both boom and dipper are at the instant command of the levers at all times and cables are kept taut automatically.

Koehring independent "crowd" permits operator to raise dipper far out beyond and above the end of the boom. Short boom and long sticks for work in close quarters still give the Koehring long reach and high lift!

In this greater operating flexibility, together with higher speed and smoother functioning due to finger-tip ease of lever control, the Koehring is decidedly an extra capacity shovel with the reliability and service life of Koehring Heavy Duty construction.

Shovel Capacities

No. 1 — $\frac{3}{4}$ -cu. yd. dipper struck measure, or $\frac{1}{2}$ -cu. yd. dipper, heap measure, on 19 ft. 6 in. boom with 16 ft. dipper stick; 4-cylinder, 8x6 in. gasoline engine, 1000 R. P. M.

No. 2 — $1\frac{1}{4}$ -cu. yd. dipper, struck measure, or $1\frac{1}{4}$ cu. yd. dipper, heap measure, on 20 ft. 7 in. boom, with 16 ft. dipper stick; 4-cylinder, $5\frac{1}{2}$ x7 in. gasoline engine, 925 R. P. M.

Write for
Shovel Bulletin No. 56



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DRAGLINES AND SHOVELS
MILWAUKEE, WISCONSIN

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Sales Offices and Service Warehouses in all
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Foreign Department—Room 1370, 50 Church
St., New York City.

Canada—Koehring Company of Canada, Ltd.,
105 Front Street, East, Toronto, Ontario.

Mexico—F. S. Lapum, Cinco De Mayo 21,
Mexico, D. F.

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BRONZE TABLETS

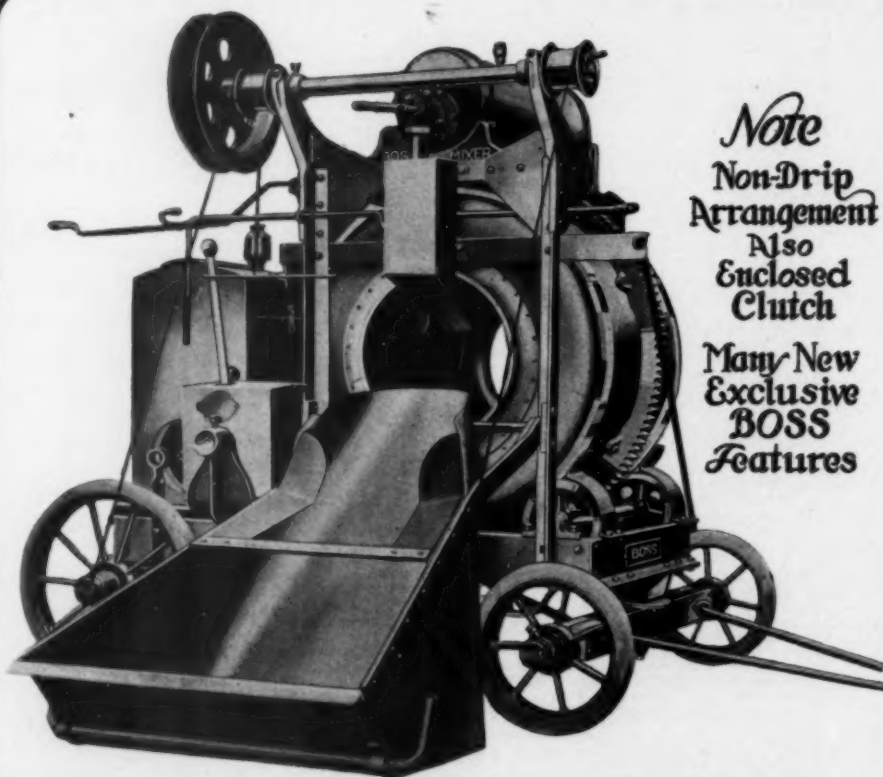
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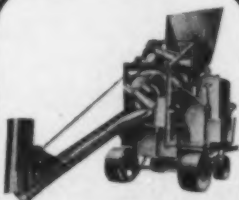
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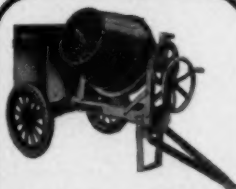
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- *Whiting Corp., Harvey, Ill.

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- *Lee Trailer & Body Co., Chicago, Ill.
- *Ransome Concrete Mch. Co., Dunellen, N. J.
- *Toledo Wheelbarrow Co., Toledo, Ohio.

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This is the new Center Drive Truck that is making such remarkable performance records. Note the simple direct drive to 4 large wheels at center of truck. That explains it. It is a worthy mounting for the shovel that has always kept in the lead of shovel developments. Send for Bulletin 201. You will find it interesting.

Shovel Users—Read This

This was a tough job—as tough as any you are ever likely to tackle. Read how it was licked with a Thew on the new Center Drive Truck.

Gentlemen:

The new type "O" caterpillar mounted shovel shipped us was placed in operation within forty-eight hours after its arrival and the photographs sent you will give you some idea of the job this shovel was started on—the trench for drainage purposes along our clay and shale bank. In digging same the shovel was compelled to travel in mud and clay up to and above the axles and at times the tread was completely filled with stiff, partly frozen fire clay and shale and at the same time was digging through twelve inches of frost on the top.

We inquired from our Operating Department if they were trying to break the shovel and our superintendent replied "after we finish the present job we will know if the shovel has any defects."

We are pleased to advise you that after giving your shovel, particularly the tread, the hardest kind of test, we are entirely satisfied with our purchase and can recommend your new caterpillar mounting to anyone requiring the service of such equipment.

Yours very truly,

THE MAPLETON CLAY PRODUCTS CO.

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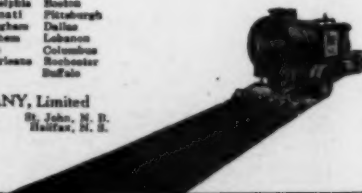
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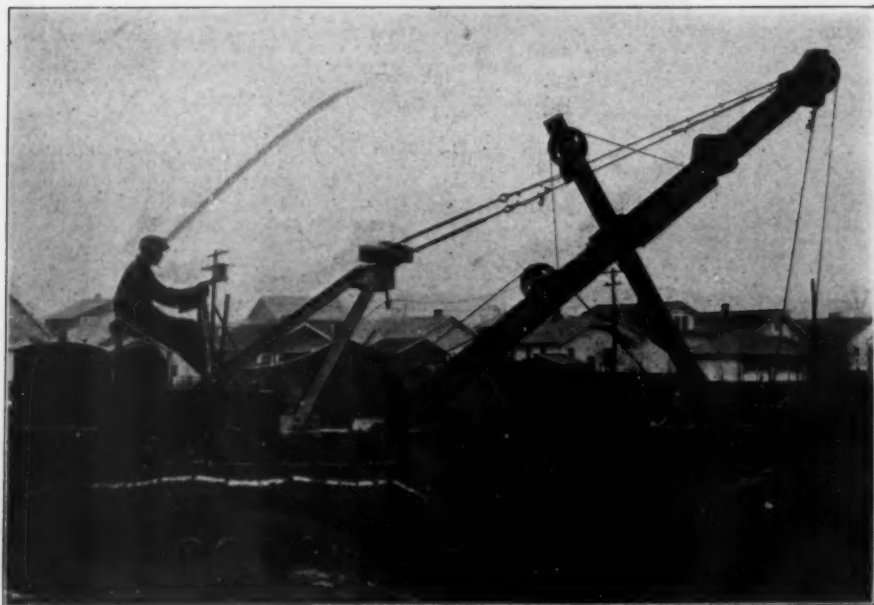
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and The Big Excavator

does not always handle the greatest yardage although expensive of upkeep and first cost.

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INSLEY MANUFACTURING COMPANY

Engineers and Manufacturers
INDIANAPOLIS

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

15

Lakeside Bridge & Steel Co., N. Milwaukee, Wis.
Taylor Portable Steel Derrick Co., Chicago, Ill.

DERRICKS, STEEL PORTABLE

*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.
*Lidgerwood Manufacturing Co., New York
American Hoist & Derrick Co., St. Paul, Minn.

DERRICKS, TRAVELING

*Bay City Dredge Works, Bay City, Mich.
*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.
American Hoist & Derrick Co., St. Paul, Minn.
Austin Machinery Corp'n, Muskegon, Mich.
Hayward Co., New York
Nat'l Hoisting Engine Co., Harrison, N. J.
Orion & Steinbrenner Co., Chicago, Ill.

DIESEL ENGINES. (See Engines, Oil)

DISTRIBUTORS, TAR AND ASPHALT

*Kinney Mfg. Co., Boston, Mass.

DISTRIBUTING PLANTS, CONCRETE

*Lakewood Engineering Co., Cleveland, O.
*Insley Mfg. Co., Indianapolis, Ind.
Archer Iron Works, Chicago, Ill.
Ransome Concrete Mch'y. Co., Dunellen, N. J.

DITCHING MACHINES. (See Excavators, Ditch and Trench)

DIVIDING PLATES (ROAD)

*Godwin Co., W. S., Baltimore, Md.

DOORS, HOLLOW METAL

Art Metal Const'n Co., Jamestown, N. Y.
Dehlstrom Metallic Door Corp., Jamestown, N. Y.
Lawton-Stephens Co., Brooklyn, N. Y.
McFarland Co., J. O., La Porte, Ind.
United Metal Products Co., Canton, Ohio.

DOORS, METAL (KALAMBEIN)

Friedrich Co., E. H. Holyoke, Mass.
Penn Metal Co., Boston, Mass.
Riester & Thesmacher Co., Cleveland, Ohio.
Sykes Co., Chicago, Ill.
Thorp Fireproof Door Co., Minneapolis, Minn.

DOORS AND SHUTTERS, STEEL ROLLING

Cornell Iron Works, Inc., New York.
Kinneer Mfg. Co., Columbus, O.
Variety Fire Door Co., Chicago, Ill.
Wilson Corp., J. G., New York.

DRAFTING MACHINES

Universal Drafting Machine Co., Cleveland, O.

DRAINAGE TOOLS

*Oliver Ames & Sons Corp., North Easton, Mass.
*Ames Shovel & Tool Co., Boston, Mass.
*Geo. Griffiths Co., Cheltenham, Pa.
*The H. M. Myers Co., Beaver Falls, Pa.
*T. Rowland's Sons, Inc., Cheltenham, Pa.
*St. Louis Shovel Co., Plant, St. Louis, Mo.
*Wright Shovel Co., Anderson, Ind.

DREDGES

*Bay City Dredge Works, Bay City, Mich.
*Lidgerwood Manufacturing Co., New York
*Michigan Dredge Co., Bay City, Mich.
*Osgood Co., The, Marion, O.
American Steel Dredge Co., Fort Wayne, Ind.
Bucyrus Co., South Milwaukee, Wis.
Ellicott Machine Corp'n, Baltimore, Md.
Erie Steam Shovel Co., Erie, Pa.
Hayward Co., New York
Marion Steam Shovel Co., Marion, O.
Stockton Iron Works, Stockton, Cal.
Street Bros. Machine Works, Chattanooga, Tenn.
Superior Iron Works, Superior, Wis.

DREDGES, DIPPER

*Bay City Dredge Works, Bay City, Mich.
*Osgood Co., Marion, O.
American Steel Dredge Co., Fort Wayne, Ind.
Austin Machinery Corp'n, Muskegon, Mich.
Bucyrus Co., South Milwaukee, Wis.
Fairbanks Steam Shovel Co., Marion, O.
Marion Steam Shovel Co., Marion, O.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.

DREDGES, HYDRAULIC

Bucyrus Co., South Milwaukee, Wis.
Ellicott Mach. Corp., Baltimore, Md.
Fairbanks Steam Shovel Co., Marion, O.
Marion Steam Shovel Co., Marion, O.
Morris Machine Works, Baldwinville, N. Y.

DREDGING PUMPS AND ACCESSORIES

Erie Pump & Engine Wks., Medina, N. Y.

DRILLS, AIR AND ROCK

*Dallett Co., The, Philadelphia, Pa.
*Denver Rock Drill Mfg. Co., Denver, Colo.
*McKiernan-Terry Drill Co., New York
*Sullivan Machinery Co., Chicago, Ill.
*Wood Drill Wks., Paterson, N. J.
Chicago Pneumatic Tool Co., New York.
Cleveland Pneumatic Tool Co., Cleveland, Ohio.
Cleveland Rock Drill Co., Cleveland, Ohio.
Helwig Mfg. Co., St. Paul, Minn.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co., New York.

DRILLS, CORE

*McKiernan-Terry Drill Co., New York.
*Sullivan Machinery Co., Chicago, Ill.
Dobbins Core Drill Co., Inc., New York
Ingersoll-Rand Co., New York.
Standard Diamond Drill Co., Chicago, Ill.

DRILLS, HAMMER (PNEUMATIC)

*Denver Rock Drill Mfg. Co., Denver, Colo.
*McKiernan-Terry Drill Co., New York.
*Sullivan Machinery Co., Chicago, Ill.
*Wood Drill Works, Paterson, N. J.
Chicago Pneumatic Tool Co., New York.
Cleveland Pneumatic Tool Co., Cleveland, O.
Cleveland Rock Drill Co., Cleveland, O.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., New York.

DRILLS FOR WELLS AND BLAST HOLES

(See Well Drilling Machinery)

DRUMS, HOLDING

*Blaw-Knox Co., Pittsburgh, Pa.
*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.
Hayward Co., New York.
Monaghan Machine Co., Chicago, Ill.

DRYERS, ASPHALT AND CEMENT

*East Iron & Machine Co., Lima, Ohio.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Co., Detroit, Mich.
American Process Co., New York.
Atlas Dryer Co., Cleveland, O.
Bartlett & Snow Co., C. O., Cleveland, O.
Cummer & Son Co., P. D., Cleveland, O.
Ruggles-Coles Eng. Co., New York.

DRYERS, SAND AND GRAVEL

*Aeroll Burner Co., Union Hill, N. J.
*Littleford Bros., Cincinnati, Ohio.
Bartlett & Snow Co., C. O., Cleveland, Ohio.
Chase & Lyman, Boston, Mass.

DUMP BODIES FOR MOTOR TRUCKS

*Easton Car & Const'n Co., Easton, Pa.
*Hail Company, Milwaukee, Wis.
*The Hug Co., Highland, Ill.
*Hughes-Keenan Co., Mansfield, Ohio
*Insley Mfg. Co., Indianapolis, Ind.
*International Motor Co., New York
*Littleford Bros., Cincinnati, O.
*Stewart Iron Wks. Co., Cincinnati, Ohio
Archer Iron Works, Chicago, Ill.
Columbia Body Corp., Columbia, Pa.
Columbian Steel Tank Co., Kansas City, Mo.
Dittwiler Mfg. Co., Gallon, Ohio
Gallon All Steel Body Co., Gallon, Ohio.
Griceom-Russell Co., New York
Jennings Automatic Dump Body, Roanoke, Va.
Lee Trailer & Body Co., Chicago, Ill.
Meads Body Co., Keokuk, Iowa.
Marion Steel Body Co., Marion, Ohio.
Pechstein Iron Works, Keokuk, Iowa.
Van Dora Iron Wks., Cleveland, Ohio.
Wood Hydr. Hoist & Body Co., Detroit, Mich.

DUMP CARTS AND WAGONS, HORSE DRAWN

*Austin-Western Road Mach'y. Co., Chicago, Ill.
*Russell Grader Mfg. Co., Minneapolis, Minn.

INDUSTRIAL
CRAWLING TRACTOR CRANES

ENUMERATE the factors that enter into the selection of the finest kind of material-handling equipment and you analyze the appeal of the **INDUSTRIAL** crawling tractor crane.

INDUSTRIAL WORKS
BAY CITY MICH.

TONS & WEIGHT
P. & C. CO.

INDUSTRIAL

The advertisement features a large, black and white photograph of an industrial construction site. A massive crane, with the word "INDUSTRIAL" written on its boom, is lifting a large, rectangular sign. The sign contains text about the benefits of Industrial Crawling Tractor Cranes and the name of the company, Industrial Works, Bay City, Mich. The background shows a large building under construction, with various structural elements and scaffolding visible. The overall tone is industrial and professional.

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Where to Purchase

17

Acme Road Machinery Co., Frankfort, N. Y.
Acme Wagon Co., Emigsville, Pa.
Austin Mfg. Co., Chicago, Ill.
Columbia Body Corp., Columbia, Pa.
Convertible Wagon-Trailers, Inc., Buffalo, N. Y.
Eagle Wagon Works, Auburn, N. Y.
Gilbert Mfg. Co., Aberdeen, S. D.
Kolschog & Bro., Geo. H., Jeffersonville, Ind.
Little Red Wagon Co., Omaha, Neb.
Stockland Road Mach'y Co., Minneapolis, Minn.
Watson Products Corp., Canastota, N. Y.
Western Wheeled Scraper Co., Aurora, Ill.

DUST LAYING (CALCIUM CHLORIDE)

*Dew Chemical Co., Midland, Mich.
*Solvay Process Co., New York
Carbondale Calcium Co., Carbondale, Pa.

DYNAMITE (See Explosives)

EJECTORS, SEWAGE (See Sewage Ejectors)

ELECTRIC GENERATORS AND MOTORS

Louis Allis Co., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Crocket-Wheeler Co., Ampere, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Idea Elec. & Mfg. Co., Mansfield, O.
Lincoln Electric Co., Cleveland, O.
Robbins & Myers Co., Springfield, O.
Triumph Electric Co., Cincinnati, O.
Wagner Elec. Mfg. Co., St. Louis, Mo.
Western Electric Co., New York
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC LAMPS

General Electric Co., Schenectady, N. Y.
Westinghouse Lamp Co., New York.

ELECTRIC LIGHTING PLANTS

*Climax Engineering Co., Clinton, Ia.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Universal Motor Co., Oshkosh, Wis.
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.
Western Electric Co., New York.

ELECTRIC SUPPLIES, METERS, ETC.

General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.

ELECTRIC TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Kuhlman Electric Co., Bay City, Mich.
Westinghouse Elec. & Mfg. Co., E. Pittsb'gh, Pa.

ELECTRIC WIRES AND CABLES. (See "Wire and Cable")

ELEVATORS, BUCKET

*Atlas Eng. Co., Milwaukee, Wis.
*Austin-Western Road Mach'y Co., Chicago, Ill.
*Good Roads Mach'y Co., Kennett Square, Pa.
*Haisa Mfg. Co., Geo., New York.
*Littleford Bros., Cincinnati, Ohio.
*Russell Grader Mfg. Co., Minneapolis, Minn.
*Spears-Wells Mach'y Co., Oakland, Cal.
*Universal Road Machinery Co., Kingston, N. Y.
Austin Mfg. Co., Chicago, Ill.
Bartlett & Snow Co., C. O., Cleveland, O.
Chain Belt Co., Milwaukee, Wis.
Fairfield Engineering Co., Lancaster, Ohio.
Gifford-Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Olson & Co., Sam'l., Chicago, Ill.
Robins Conv. Belt Co., New York.
Webster Mfg. Co., Chicago, Ill.
Weller Mfg. Co., Chicago, Ill.
Worthington Pump & Machy. Corp., New York.

ELEVATORS, PASSENGER, FREIGHT, ETC.

Amer. Elevator & Mach. Co., Louisville, Ky.
Atlantic Elevator Co., Inc., Philadelphia, Pa.
Bay State Elevator Co., Springfield, Mass.
Houghton Elev. & Mach. Co., Toledo, Ohio.
Kestner & Hecht Co., Chicago, Ill.

Llewellyn Iron Works, Los Angeles, Cal.
Montgomery Elevator Co., Moline, Ill.
Otis Elevator Co., New York.
Ridgway & Son Co., C. Coatesville, Pa.
See Elec. Elevator Co., A. B., New York.
Spindel, J. G., Reading, Pa.
Warner Elevator Mfg. Co., Cincinnati, O.
Warsaw Elevator Co., Warsaw, N. Y.

ENGINES, GAS AND GASOLINE

*Alamo Engine Co., Hillsdale, Mich.
*Climax Engineering Co., Clinton, Ia.
*Domestic Engine & Pump Co., Shippensburg, Pa.
*Hercules Corp., Evansville, Ind.
*Hinkley Motors, Inc., Detroit, Mich.
*Holt Mfg. Co., Peoria, Ill.
*Note Engine Co., Lansing, Mich.
*Turner & Moore Mfg. Co., Detroit, Mich.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Buda Co., Harvey, Ill.
C. H. & E. Manufacturing Co., Milwaukee, Wis.
Charter Gas Eng. Co., Sterling, Ill.
Chicago Pneumatic Tool Co., New York.
Cook Motor Co., Delaware, Ohio.
Evinrude Motor Co., Milwaukee, Wis.
Fairbanks, Morse & Co., Chicago, Ill.
Foss Gas Engine Co., Springfield, Ohio.
Fuller & Johnson Mfg. Co., Madison, Wis.
Gade Bros. Mfg. Co., Iowa Falls, Iowa.
Hercules Motors Corp., Canton, O.
John Lauson Mfg. Co., New Holstein, Wis.
Le Roi Co., Milwaukee, Wis.
"New-Way", Motor Co., Lansing, Mich.
Universal Motor Co., Oshkosh, Wis.
Weber Engine Co., Kansas City, Mo.
Wellman-Seaver-Morgan Co., Cleveland, O.
Worthington Pump & Machy. Corp., New York.

ENGINES, KEROSENE

*Alamo Engine Co., Hillsdale, Mich.
*Climax Engineering Co., Clinton, Iowa

ENGINES, OIL

DIESEL

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Busch-Sulzer Bros.-Diesel Eng. Co., St. Louis, Mo.
Fulton Iron Works Co., St. Louis, Mo.
Haddfield-Penfield Steel Co., Bucyrus, Ohio.
McIntosh & Seymour Corp., Auburn, N. Y.
Nordberg Mfg. Co., Milwaukee, Wis.
Western Machy. Co., Los Angeles, Cal.

SEMI-DIESEL

Anderson Fdry. & Mach. Co., Anderson, Ind.
Beasmer Gas Eng. Co., Grove City, Pa.
Buckeye Machinery Co., Lima, O.
Charter Gas Eng. Co., Sterling, Ill.
Chicago Pneumatic Tool Co., New York.
De La Vergne Machine Co., New York.
Fairbanks, Morse & Co., Chicago, Ill.
Foss Gas Engine Co., Springfield, Ohio.
Ingersoll-Rand Co., New York.
Midwest Engine Co., Indianapolis, Ind.
Muncie Oil Eng. Co., Muncie, Ind.
Nordberg Mfg. Co., Milwaukee, Wis.
St. Mary's Oil Eng. Co., St. Charles, Mo.
Stover Mfg. & Engine Co., Freeport, Ill.
Taylor Machine Co., Cleveland, O.
Weber Engine Co., Kansas City, Mo.
Worthington Pump & Machy. Corp., New York.

ENGINES, PUMPING

*Climax Engineering Co., Clinton, Ia.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hooven Owens, Kentschler Co., Hamilton, O.
Murray Iron Wks., Burlington, Ia.
Nordberg Mfg. Co., Milwaukee, Wis.
Worthington Pump & Machy. Corp., New York.

ENGINES, STEAM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Dake Engine Co., Grand Haven, Mich.
Erie-Ball Engine Co., Pittsburgh, Pa.
Erie Pump & Engine Co., Medina, N. Y.
Filer-Stowell Co., Milwaukee, Wis.
Hardie-Tyner Mfg. Co., Birmingham, Ala.
Lefel Co., J., Springfield, O.
Morris Machine Works, Baldwinville, N. Y.
Murray Iron Works Co., Burlington, Ia.
Nordberg Mfg. Co., Milwaukee, Wis.
Starvant Co., B. F., Hyde Park, Boston, Mass.
Vilter Mfg. Co., Milwaukee, Wis.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.

OUR AIM—



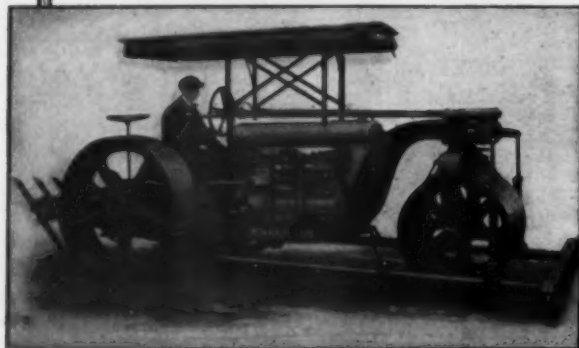
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ROAD BUILDERS



LITTLE WINNER ROAD GRADER
BLADE 6 FT. LONG · WEIGHT 1590 LBS · WE
FURNISH 6 DIFFERENT SIZED WINNER GRADERS



CHAMPION STEEL ROCK CRUSHER MOUNTED
WITH ELEVATOR SCREEN AND PORTABLE
STONE BIN



MONARCH CUB ROLLER WITH
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By furnishing reliable machinery at right prices and the best possible service.

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ROAD GRADER
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ROAD ROLLER

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Where to Purchase

19

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Dake Engine Co., Grand Haven, Mich.

EXCAVATING MACHINERY. (See Names Under Excavators, also Steam Shovels)

EXCAVATORS, CABLEWAY

Bucyrus Co., South Milwaukee, Wis.
Lidgerwood Mfg. Co., New York.

EXCAVATORS, DITCH AND TRENCH

*Barber-Green Co., Aurora, Ill.
*Bay City Dredge Wks., Bay City, Mich.
*Byers Machine Co., Ravenna, Ohio.
*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Harnischfeger Corp., Milwaukee, Wis.
*Inaley Mfg. Co., Indianapolis, Ind.
*Keystone Driller Co., Beaver Falls, Pa.
*Osgood Co., The, Marion, O.
*Russell Grader Mfg. Co., Minneapolis, Minn.
American Hoist & Derrick Co., St. Paul, Minn.
Austin Machinery Corp'n, Muskegon, Mich.
Buckeye Traction Ditcher Co., Findlay, Ohio.
Bucyrus Co., South Milwaukee, Wis.
Economy Excavator Co., Iowa Falls, Ia.
Erie Steam Shovel Co., Erie, Pa.
Fairbanks Steam Shovel Co., Marion, O.
Hayward Co., The, New York City.
Marion Steam Shovel Co., Marion, O.
Monaghan Machine Co., Chicago, Ill.
Parsons Co., Newton, Ia.
Topping Machy. Co., Chas. T. Dayton, O.

EXCAVATORS, DRAG-LINE

*Bay City Dredge Works, Bay City, Mich.
*Byers Machine Co., Ravenna, Ohio.
*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Green, L. P., Chicago, Ill.
*Harnischfeger Corp., Milwaukee, Wis.
*Industrial Works, Bay City, Mich.
*Osgood Co., The, Marion, O.
*Sawerman Bros., Chicago, Ill.
*Smith Co., T. L., Milwaukee, Wis.
Austin Machinery Corp'n, Muskegon, Mich.
Gallon Iron Works & Mfg. Co., Galion, Ohio
Browning Co., Cleveland, O.
Bucyrus Co., South Milwaukee, Wis.
Economy Excavator Co., Iowa Falls, Ia.
Erie Steam Shovel Co., Erie, Pa.
Gade Excavator Works, C. L., Iowa Falls, Iowa.
Hayward Co., New York
Link-Belt Co., Chicago, Ill.
Marion Steam Shovel Co., Marion, O.
Monaghan Machine Co., Chicago, Ill.
Parsons Co., Newton, Ia.

EXPANDED METAL

*Truscon Steel Co., Youngstown, O.
Berger Mfg. Co., Canton, O.
Consolidated Expanded Metal Co., Braddock, Pa.
Kaiman Steel Co., Chicago, Ill.
Northwestern Expanded Metal Co., Chicago, Ill.
Youngstown Pressed Steel Co., Warren, O.

EXPANSION JOINT MATERIAL

*Barber Asphalt Co., Philadelphia, Pa.
*Barrett Co., New York
*Carey Co., Philip, Cincinnati, Ohio.
*Texas Company, New York.
*Truscon Steel Co., Youngstown, O.
*Waring-Underwood Co., Philadelphia, Pa.
Hoozier Asphalt Co., Alexandria, Ind.
Pioneer Asphalt Co., Lawrenceville, Ill.
Servicised Product Corp., Chicago, Ill.

EXPLOSIVES

Atlas Powder Co., Wilmington, Del.
Du Pont de Nemours & Co., E. I. Wilmington, Del.
Giant Powder Co., Cons., San Francisco, Cal.
Grasselli Powder Co., Cleveland, O.
Hercules Powder Co., Wilmington, Del.

FENCING

*Stewart Iron Works Co., Cincinnati, Ohio
*Wickwire Spencer Steel Corp., New York.
Adrian Wire Fence Co., Adrian, Mich.
American Steel & Wire Co., Chicago, Ill.
Anchor Post Iron Works, New York.
Cyclone Fence Co., Waukegan, Ill.
Frost-Superior Fence Co., Cleveland, O.
Indiana Steel & Wire Co., Muncie, Ind.
Nitselman Bros., Muncie, Ind.
Michigan Wire Fence Co., Adrian, Mich.

Page Steel & Wire Prod. Corp., Bridgeport, Conn.
Pittsburgh Steel Co., Pittsburgh, Pa.
Texas Cyclone Fence Co., Fort Worth, Tex.
Youngstown Sheet & Tube Co., Youngstown, O.

FILING EQUIPMENT, STEEL

Art Metal Constr. Co., Jamestown, N. Y.
Berger Mfg. Co., Canton, O.
General Fireproofing Co., Youngstown, O.
Van Dorn Iron Works, Cleveland, O.

FILTERS, OIL

Bowser & Co., Inc., S. F., Fort Wayne, Ind.
Wayne Tank & Pump Co., Ft. Wayne, Ind.

FILTERS, WATER

American Water Softener Co., Philadelphia, Pa.
Graver Corporation, E. Chicago, Ind.
International Filter Co., Chicago, Ill.
Norwood Engineering Co., Florence, Mass.
Roberts Filter Co., Darby, Pa.
Scaife & Sons Co., W. B., Pittsburgh, Pa.

FIRE ALARM SYSTEMS

Gamewell Co., Newton Upper Falls, Mass.

FIRE ALARM SIRENS

Erick Elec. Siren Co., St. Paul, Minn.
Federal Sign System, Chicago, Ill.
Hendrie & Bolthoff Mfg. & Sup. Co., Denver, Col.
Interstate Machine Prod. Co., Rochester, N. Y.
Sireno Co., Stapleton, N. Y.
Union Water Meter Co., Worcester, Mass.

FIRE APPARATUS, MOTOR

*International Motor Co., New York.
Ahrens-Fox Fire Engine Co., Cincinnati, O.
American-La France Fire Eng. Co., Elmira, N. Y.
Brockway Motor Fire App. Co., Cortlandt, N. Y.
Foamite-Childs Corp., Utica, N. Y.
Hale Fire Pump Co., Conshohocken, Pa.
Northern Fire Apparatus Co., Minneapolis, Minn.
Obenchain-Boyer Co., Logansport, Ind.
Pirsch & Sons Co., Peter, Kenosha, Wis.
Prospect Fire Engine Co., Prospect, O.
Seagrave Co., Columbus, O.
Stuts Fire Engine Co., Indianapolis, Ind.
Waterous Fire Engine Works, St. Paul, Minn.

FIRE EXTINGUISHERS, CHEMICAL

American-La France Fire Eng. Co., Elmira, N. Y.
Buffalo Fire Appliance Corp., Buffalo, N. Y.
Cross Mfg. Co., C. J., Inc., New York.
Foamite-Childs Corp., Utica, N. Y.
Pyrene Mfg. Co., Newark, N. J.

FIRE HOSE (See Hose, Fire)

FIREPROOF BUILDING MATERIAL

*Truscon Steel Co., Youngstown, O.
Berger Mfg. Co., Canton, O.
Detroit Steel Prod. Co., Detroit, Mich.
General Fireproofing Co., Youngstown, O.
Kaiman Steel Co., Chicago, Ill.
Keasbey & Mattison Co., Ambler, Pa.
Kinnear Mfg. Co., Columbus, O.
National Fireproofing Co., Pittsburgh, Pa.
United States Gypsum Co., Chicago, Ill.
Youngstown Pressed Steel Co., Warren, O.

FIRST AID EQUIPMENT

American-La France Fire Eng. Co., Elmira, N. Y.

FLEXIBLE JOINTS

*Century Foundry Co., New York.
*U. S. O. I. Pipe & Fdry Co., Burlington, N. J.
Coldwell-Wilcox Co., Newburgh, N. Y.
Crane Co., Chicago, Ill.
United Lead Company, New York.

FLOORING, COMPOSITION

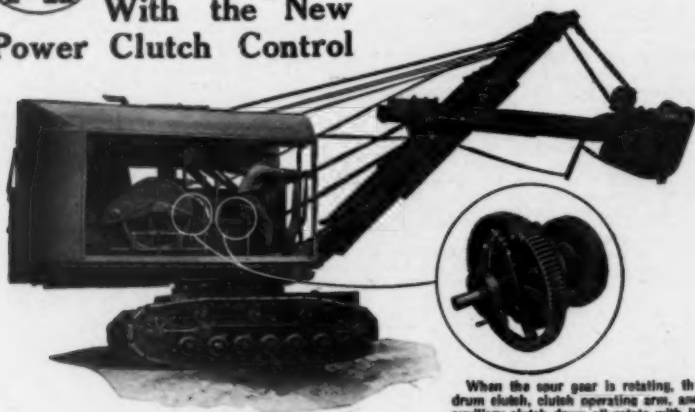
*Barber Asphalt Co., Philadelphia, Pa.
*Barrett Co., New York
Am. Mason Safety Tread Co., Lowell, Mass.
Johns-Manville, Inc., New York.
Marine Decking & Supply Co., Phila., Pa.
Muller, Franklin R., & Co., Waukegan, Ill.

FLOORS, WOOD BLOCK

*Barrett Co., New York.
Cartor Bloxond Floor Co., Kansas City, Mo.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.

P & H With the New
Power Clutch Control



When the spur gear is rotating, the drum clutch, clutch operating arm, and auxiliary clutch drum all rotate with it. When operator moves lever the hand shown on the auxiliary drum at left is tightened, retarding it. The operating arm then causes the main clutch to grip the drum.

Easier Handling—No Fatigue—Greater Yardage

Another simple but very important development — the P & H Power Clutch Control for P & H Excavators. It eliminates the hard work of operating the various clutches by sheer physical effort.



The operator just moves the lever selected toward him and the engine power does the rest. The average pull, as far as the operator is concerned, is only 4½ lbs. The Control is almost push button easy.

Faster handling of the machine is possible—and greater yardage can be excavated during the entire day.

This new feature together with the powerful P & H crowding motion

that is exerted throughout the dipper movement (from directly in front and under the operator up through the top of a bank), and the proven dependability of P & H construction and design, give the user still greater value.

If you want to make your excavating work pay bigger profits—and speed it up—get in your order for a P & H now and specify shipping date.

Bulletin 81-X mailed on request

HARNISCHFEGER CORPORATION

Successor to

PAWLING & HARNISCHFEGER CO.

Excavating Machinery Division
Established in 1884

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Philadelphia
Atlanta
Jacksonville
Minneapolis

Chicago
Kansas City
San Francisco
Pittsburgh
Detroit

Portland
Memphis
Los Angeles
Seattle
Dallas

Warehouses and Service Stations: New York, Memphis, San Francisco, Los Angeles

P & H GAS SHOVEL

When writing to advertisers, please mention the Contractors' & Engineers' Monthly—Thank you.

Where to Purchase

21

Jennison-Wright Co., Toledo, O.
Midland Cressoting Co., Toledo, O.
Republic Cressoting Co., Indianapolis, Ind.
Sou. Wood Preserving Co., Atlanta, Ga.
Wyckoff Pipe & Cressoting Co., New York.

FLUSH TANKS

Pacific Flush Tank Co., Chicago, Ill.

FLUSHERS, STREET. (See Street Flushers and Sprinklers.)

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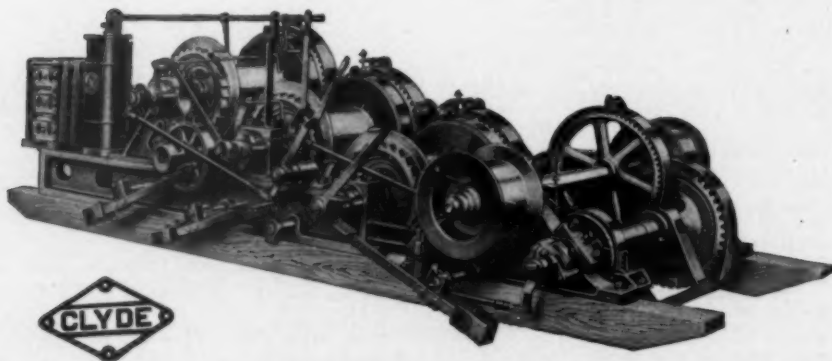
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LOADERS, GRAVEL, WAGON, CAR, ETC.

- *Atlas Engineering Co., Milwaukee, Wis.
- *Barber-Greene Co., Aurora, Ill.
- *Bay City Dredge Works, Bay City, Mich.
- *Green, L. P. Chicago, Ill.
- *Hais Mfg. Co., Geo., New York.
- *Sauerman Bros., Chicago, Ill.
- *Smith Co., T. L., Milwaukee, Wis.
- *Spears-Weils Mach'y Co., Oakland, Cal.
- *Universal Road Machinery Co., Kingston, N. Y.
- Austin Machinery Corp'n, Muskegon, Mich.
- Bonney Supply Co., Inc., Rochester, N. Y.
- Chain Belt Co., Milwaukee, Wis.
- Conant Machine Co., Concord Junction, Mass.
- Fairfield Engineering Co., Lancaster, Ohio.
- Gifford-Wood Co., Hudson, N. Y.
- Jeffrey Mfg. Co., Columbus, O.
- Lee Trailer & Body Co., Chicago, Ill.
- Link-Belt Co., Chicago, Ill.
- Nelson Iron Wks., Brooklyn, N. Y.
- Portable Machy. Co., Passaic, N. J.
- Sackett Screen & Chute Co., H. B., Chicago, Ill.
- Specialty Eng. Co., Philadelphia, Pa.
- Weller Mfg. Co., Chicago, Ill.

LOCK BAR STEEL PIPE

- East Jersey Pipe Co., New York.

LOCKERS, STEEL

- Durand Steel Locker Co., Chicago, Ill.
- Hart & Hutchinson Co., New Britain, Conn.
- Lyon Metallic Mfg. Co., Aurora, Ill.
- Medart Mfg. Co., Fred., St. Louis, Mo.

LOCOMOTIVES, FOR CONTRACTORS, ETC.

- *Fate-Root-Heath Co., Plymouth, O.
- *Plymouth Locomotive Works, Plymouth, O.
- American Locomotive Co., New York.
- Baldwin Locomotive Works, The, Phila., Pa.
- Brookville Tract & Tractor Co., Brookville, Pa.
- Davenport Locomotive Works, Davenport, Ia.
- Lima Locomotive Wks., Lima, O.
- Industrial Equipment Co., Inc., Minster, O.
- Milwaukee Locomotive Mfg. Co., Milwaukee, Wis.
- Porter Co., H. K., Pittsburgh, Pa.
- Vulcan Iron Works, Wilkes-Barre, Pa.
- Westinghouse Elec. & Mfg. Co., E. Pitts'gh, Pa.
- Whitcomb Co., Geo. D., Rochelle, Ill.

LUMBER, HEAVY CONSTRUCTION

- Brown Co., Portland, Me.
- Crowell & Spencer Lumber Co., Long Leaf, La.
- Exchange Sawmills Sales Co., Kansas City, Mo.
- Great Southern Lumber Co., Bogalusa, La.
- Industrial Lumber Co., Elizabeth, La.
- Long Bell Lumber Co., Kansas City, Mo.
- Sargent Lumber Co., Little Rock, Ark.
- Sternor Co., Inc., E. J., New York.
- Weyerhaeuser Sales Co., Spokane, Wash.

LUMBER, STEEL

- *Truscon Steel Co., Detroit, Mich.
- Berger Mfg. Co., Canton, O.
- General Fireproofing Co., Youngstown, O.

MANHOLE COVERS. (See "Castings, Street")

METAL LATH. (See "Lath")

METAL ROOFING (See "Roofing")

METER BOXES

- *Ford Meter Box Co., Wabash, Ind.
- Clark Co., H. W., Mattoon, Ill.
- Clow & Sons, J. B., Chicago, Ill.
- Columbian Iron Works, Chancocoga, Tenn.
- Mueller Company, Decatur, Ill.

METER COUPLINGS

- *Ford Meter Box Co., Wabash, Ind.
- *Neptune Meter Co., New York.
- *Pittsburgh Meter Co., Pittsburgh, Pa.
- *Union Water Meter Co., Worcester, Mass.
- Clark Co., H. W., Mattoon, Ill.
- Mueller Company, Decatur, Ill.

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- *Ford Meter Box Co., Wabash, Ind.
- *Neptune Meter Co., New York.

- *Pittsburgh Meter Co., Pittsburgh, Pa.
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- Mueller Co., Decatur, Ill.
- National Meter Co., New York.

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- Duncan Elec. Mfg. Co., LaFayette, Ind.
- General Electric Co., Schenectady, N. Y.
- Sangamo Electric Co., Springfield, Ill.
- Westinghouse El. & Mfg. Co., E. Pittsburgh, Pa.

METERS, GAS

- *Pittsburgh Meter Co., Pittsburgh, Pa.
- American Meter Co., New York.
- Bailey Meter Co., Cleveland, O.
- Builders Iron Fdry., Providence, R. I.
- Cleveland Gas Meter Co., Cleveland, O.

METERS, Water, Oil and Gasoline

- *Badger Meter Mfg. Co., Milwaukee, Wis.
- *Neptune Meter Co., New York.
- *Pittsburgh Meter Co., Pittsburgh, Pa.
- *Union Water Meter Co., Worcester, Mass.
- Buffalo Meter Co., Buffalo, N. Y.
- Federal Meter Co., Brooklyn, N. Y.
- Gamon Meter Co., Newark, N. J.
- Hersey Mfg. Co., Boston, Mass.
- National Meter Co., New York.
- Thomson Meter Co., Brooklyn, N. Y.
- Worthington Pump & Mch'y. Corp., New York.

METERS, WATER (VENTURI TYPE)

- Builders Iron Foundry, Providence, R. I.
- Simplex Valve & Meter Co., Philadelphia, Pa.

MIXERS, CONCRETE (See Concrete Mixers)

MIXERS, GROUT

- *American Cement Mch'y. Co., Inc., Keokuk, Ia.
- *Lakewood Engineering Co., Cleveland, O.
- Kent Machine Co., Kent, O.
- Union Iron Works, Inc., Hoboken, N. J.

MIXERS, HOT

- *Barber Asphalt Co., Philadelphia, Pa.
- *Koechling Co., Milwaukee, Wis.
- Austin Machinery Corp'n, Muskegon, Mich.

MIXERS, MORTAR

- *American Cement Mch'y. Co., Inc., Keokuk, Ia.
- *Blaw-Knox Co., Pittsburgh, Pa.
- *Construction Machinery Co., Waterloo, Ia.
- *Lakewood Engineering Co., Cleveland, O.
- *Smith Co., T. L., Milwaukee, Wis.
- Austin Machinery Corp'n, Muskegon, Mich.
- C. H. & E. Manufacturing Co., Milwaukee, WI
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- Lansing Co., Lansing, Mich.
- Marsh-Capron Co., Chicago, Ill.
- Ransome Concrete Mch'y. Co., Dunellen, N. J.

MOTORCYCLES

- Ace Motor Corp., Philadelphia, Pa.
- Cleveland Motorcycle Co., Cleveland, Ohio.
- Excelsior Motor Mfg. & Supply Co., Chicago, Ill.
- Harley-Davidson Motor Co., Milwaukee, Wis.
- Indian Motorcycle Co., Springfield, Mass.

MOTORS, ELECTRIC (See Electric Generators and Motors)

MOTORS, GASOLINE

- *Climax Engineering Co., Clinton, Iowa
- *Hinkley Motors, Inc., Detroit, Mich.
- Buda Co., Harvey, Ill.
- Continental Motors Corp., Detroit, Mich.
- Waukesha Motor Co., Waukesha, Wis.
- Wisconsin Motor Mfg. Co., Milwaukee, Wis.

MOTOR TRUCKS

- *Ford Motor Co., Detroit, Mich.
- *General Motors Truck Co., Pontiac, Mich.
- *International Motor Co., New York.
- *United Motor Products Co., Grand Rapids, Mich.
- Acme Motor Truck Co., Cadillac, Mich.
- Atterbury Motor Car Co., Buffalo, N. Y.
- Autocar Co., Ardmore, Pa.
- Bessemer Motor Truck Co., Grove City, Pa.
- Broxway Motor Truck Co., Cortland, N. Y.
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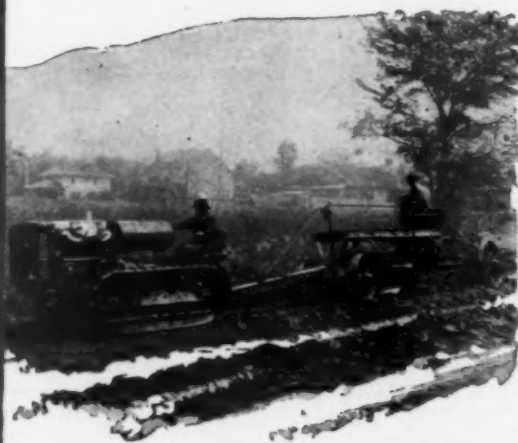


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Kelly Springfield Motor Truck Co., Springfield, O.
Kissel Motor Car Co., Hartford, Wis.
Larrabee-Deyo Motor Tr. Co., Binghamton, N. Y.
Nash Motors Co., Kenosha, Wis.
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Republic Motor Truck Co., Alma, Mich.
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Sterling Motor Truck Co., Milwaukee, Wis.
Stewart Motor Corp'n, Buffalo, N. Y.
Traffic Motor Truck Co., St. Louis, Mo.
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White Co., Cleveland, Ohio.

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*Texas Company, New York.
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Pioneer Asphalt Co., Lawrenceville, Ill.
Standard Oil Co., (La.), New Orleans, La.
Standard Oil Co., (N. J.), Newark, N. J.
Standard Oil Co., (N. Y.), New York.

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OXYGEN

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Leadite Co., The, Philadelphia, Pa.
United Lead Company, New York.

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Detroit White Lead Wks., Detroit, Mich.
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Sonneborn Sons, Inc., L., New York.
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Johns-Manville, Inc., New York.
National Roofing Co., Tonawanda, N. Y.
Ruberoid Co., New York.

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*Stewart Iron Works Co., Cincinnati, O.
Art Concrete Works, Pasadena, Calif.
Bauman Mfg. Co., Millersville, Pa.
Dow Co., Louisville, Ky.
Meyers Mfg. Co., Fred T., Hamilton, Ohio.
Mott Iron Wks., J. L., New York.

PAVING AND ROAD ROLLERS. (See Road and Paving Rollers)

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Republic Creosoting Co., Indianapolis, Ind.
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Coffeyville Vit. Brick & Tile Co., Coffeyville, Kans.
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McAvoy Vit. Brick Co., Philadelphia, Pa.
Martinsville Brick Co., Martinsville, Ind.
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Nelsonville Brick Co., Nelsonville, O.
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Patton Brick Co., Watsontown, Pa.
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Toronto Fire Clay Co., Toronto, Ohio.
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Veedsburg Paver Co., Veedsburg, Ind.
Western Shale Products Co., Fort Scott, Kans.
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PAVING MACHINERY. (See Road and Paving Machinery)

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*Godwin Co., W. S., Baltimore, Md.

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PAVING MIXERS. (See Concrete Mixers)

PAVING TOOLS

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Lynchburg Foundry Co., Lynchburg, Va.
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American Wood Pipe Co., Tacoma, Wash.
Continental Pipe Mfg. Co., Seattle, Wash.
Michigan Pipe Co., Bay City, Mich.
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Crane Co., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Reading Steel Casting Co., Inc., Bridgeport, Conn.
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Wood & Co., R. D., Philadelphia, Pa.

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Taylor Portable Steel Derrick Co., Chicago, Ill.

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Ruberoid Co., New York.

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Leadite Co., The, Philadelphia, Pa.
United Lead Co., New York.

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Oliver Chilled Plow Works, South Bend, Ind.
Roderick Loan Mfg. Co., Mansfield, Ohio
Sidney Steel Scraper Co., Sidney, O.
Slusser-McLean Scraper Co., Sidney, O.
Smith & Sons Mfg. Co., Kansas City, Mo.
Western Wheeled Scraper Co., Aurora, Ill.
Wiard Plow Co., Batavia, N. Y.

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Crane Co., Chicago, Ill.
Glauber Brass Mfg. Co., Cleveland, O.
Mott Iron Wks., J. L., New York.
Muelier Company, Decatur, Ill.
Randle-Spence Mfg. Co., Milwaukee, Wis.
United Brass Mfg. Co., Cleveland, O.
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Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

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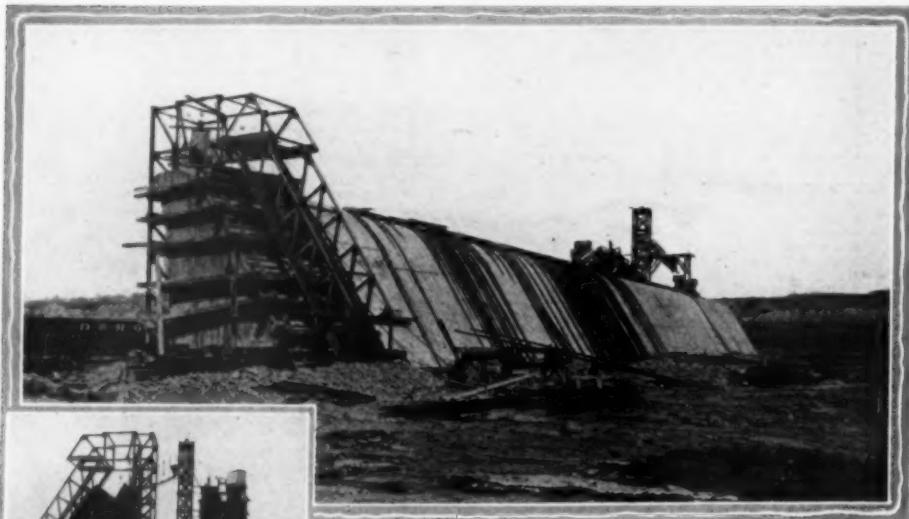
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Conservancy District—Platt Rogers, Inc., Contractors.

Pueblo Has Seen the Last of Its Floods

The Rock Canyon Barrier Dam is the backbone of Pueblo's flood prevention project—initiated to prevent a recurrence of that terrible disaster of three years ago, when many lives were lost and the property damage was enormous. It is now on a fair way to completion.

1,600 feet long and 35 feet high—this immense dam will retard the flood waters of the Arkansas River, and prevent inundation of the country in and around Pueblo.

Platt Rogers, Inc., the contractors on this work, used the engineering service of the Blaw-Knox Company to good advantage. The big traveling Blawforms, designed and built by Blaw-Knox, proved their value by saving a lot of time, labor and trouble—and by speeding up the work.

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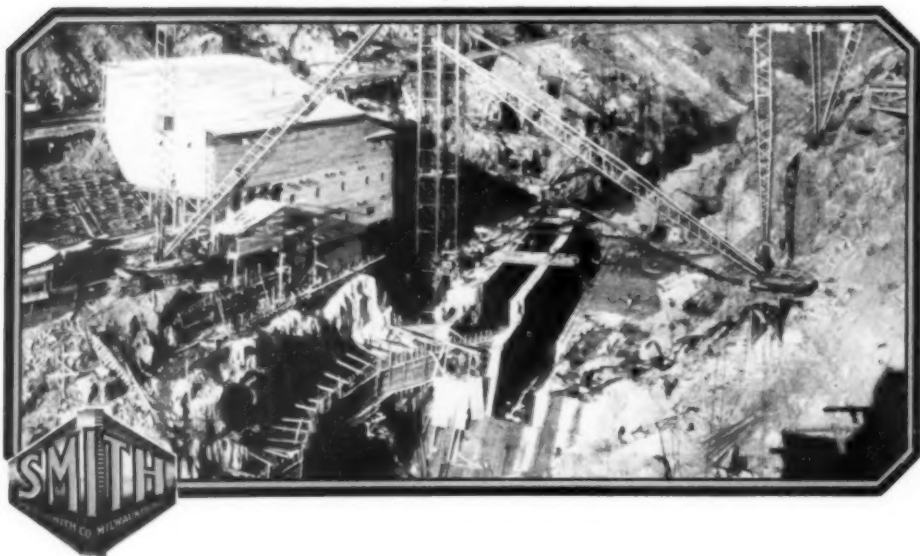


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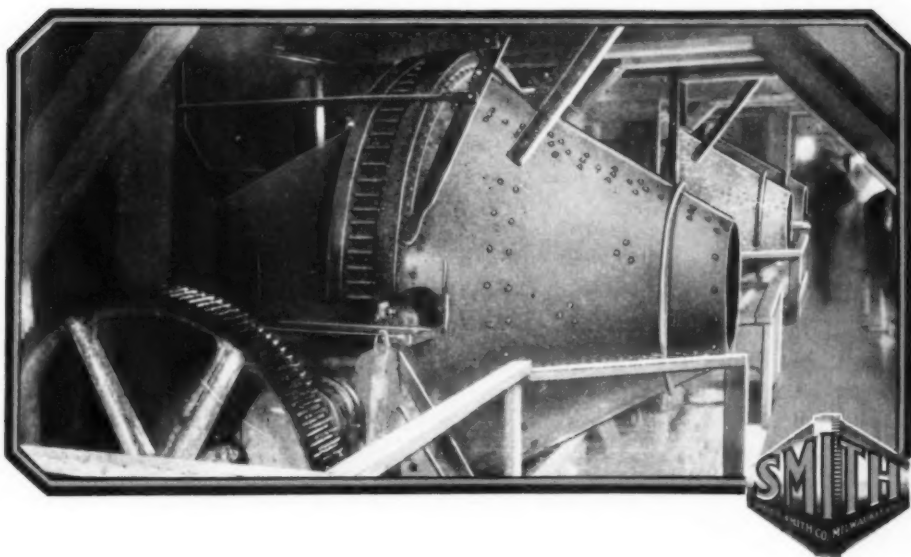
Exchequer Dam Being Built

Bent Bros., Inc., are using three Smith 56-S Tilting Mixers in the construction of the Exchequer Dam and Power House in the Merced Irrigation District, California. Some idea of the bigness of the job is given by the following figures.

The proposed height of the dam is 326 ft., its length 950 ft., and its width at base 221 ft. A storage capacity of 280,000 acre feet is planned and two power units will be erected, each capable of producing 16,750 hp. In all, the work will require 380,000 cu. yds. of concrete, all of which will be poured by the three Smith 56-S (two-yard) tilting mixers.

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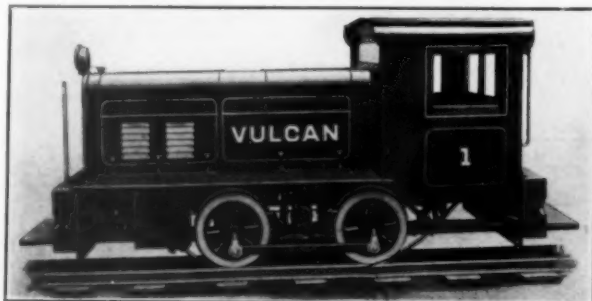
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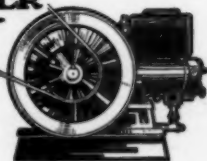
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- Simplex Ejector Co., Chicago, Ill.

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- Simplex Ejector Co., Chicago, Ill.

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- Laclede Christy Clay Products Co., St. Louis, Mo.
- Macomb Sewer Pipe Wks., Macomb, Ill.
- Pacific Clay Products Co., Los Angeles, Cal.
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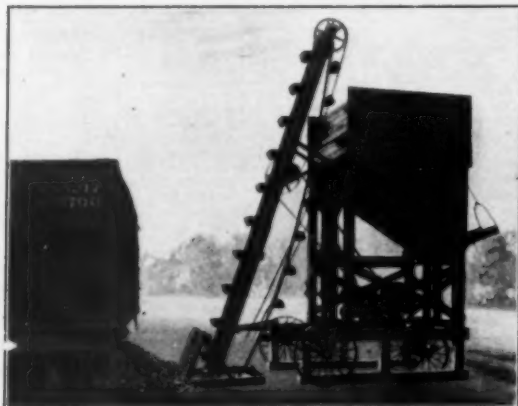
- American Vit. Products Co., Akron, O.
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- Dee Co., Wm. E., Chicago, Ill.
- Delaware Clay Products Co., Pittsburgh, Pa.
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 *Keystone Driller Co., Beaver Falls, Pa.
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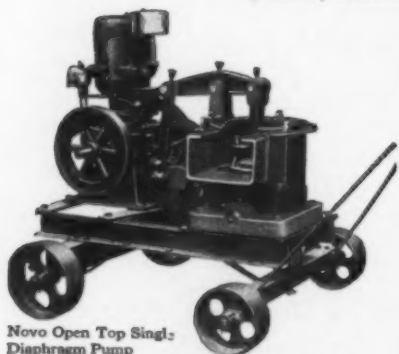
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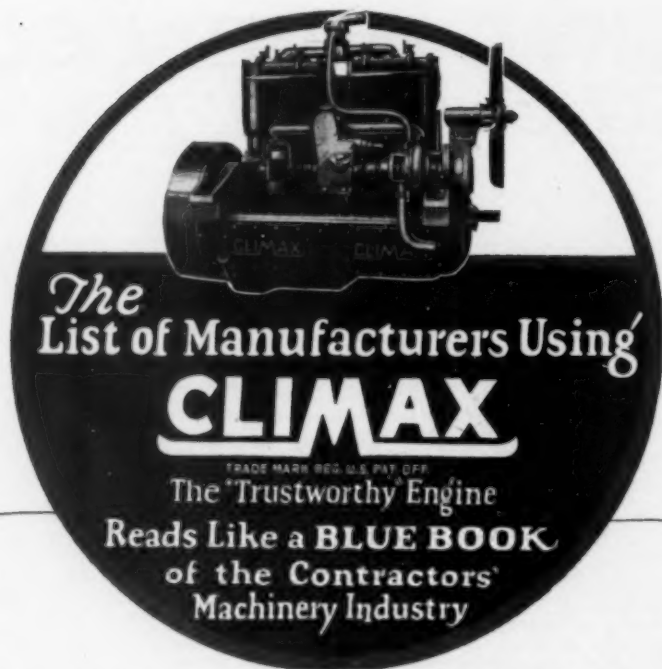
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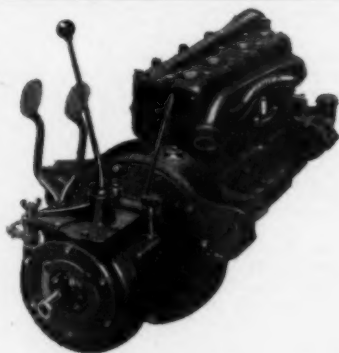
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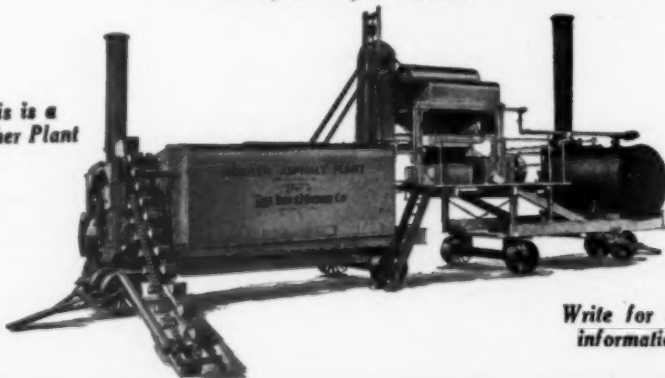
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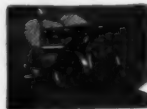
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In Ohio there was The Hill & Hill Co. of Elyria who were awarded the contract for 15 miles of 16 foot pavement in Ashtabula County.

The road after the winter season was in very bad shape so that truck haulage over it was practically impossible. A railroad paralleled the road about 4 miles away. After careful consideration the contractors decided to use the combination of truck and industrial track haulage, including two Plymouth Gasoline Locomotives.

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The contractors estimate they could not have worked 50 per cent of the time with any other method of haulage.

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Making It Safer for the "Human Fly"

A Discussion of Safety Measures Which Are Now Common Practice Among Progressive Contractors

By W. F. Austin

President, W. E. Wood Company, Detroit, Mich.

CAN you remember the time when no large construction undertaking was complete without from six to fifteen fatalities? Do you recall the damage suits brought against construction companies following accidents of any sort? That is not so many years ago, but during the past few years a tremendous change has come over the building industry. The number of accidents has decreased, and also the number of lost days on account of accidents. When one stops to consider that every day of work lost on account of any minor accident, every death upon a construction job, costs the contractor money, the steps taken to promote a greater degree of safety in the building game will assume their true importance and significance.

It is true that accidents still occur. There was one fatality in the construction of the J. L. Hudson store, and the Buhl Building has exacted a toll of life. But the day of fatal accidents is fast leaving, for contractors as a rule realize that it means money saved to prevent them.

Whereas insurance companies formerly insured men under what was known as the experience rating, giving to the contractor who conducted his business over a period of years, so as to reduce accidents to a bare minimum, a lower rate than to one who paid little attention to the hazards of the game, the present method of operation is under the direct supervision of the State Industrial Accident Board. Formerly, contractors operated under the common law, but they have been operating under the Workmen's Compensation Law since 1913. As a consequence, accidents have been ma-

This discussion was originally written as an address and delivered before the convention of the National Safety Council at Louisville, Ky. Because of the great industrial building activity in Detroit, which now ranks third in total construction costs for the year, it was reprinted in "The Detroitier," the organ of the Detroit Board of Commerce. The article is reprinted here for readers of CONTRACTORS' & ENGINEERS' MONTHLY, as it gives helpful suggestions and tells the story of how the construction industry may be made even more safe.

terially reduced, but much remains to be done. The question, "How can I establish safety?" is often asked and too infrequently answered in the construction game.

We have heard of the necessity and the desirability of safety work on many occasions. The construction industry is deprived of many laborers because of accidents and fatalities, and many workers are refused admission to this

country on account of the immigration restrictions.

At the same time, we must look at this scarcity of men from another angle. I believe it was the *Literary Digest* that sent out a questionnaire some time ago to try to ascertain why young men did not enter the building trades. The answers to that questionnaire indicated that a great many native-born American young men are avoiding the building trades because of the hazards and because of the fact that they would be obliged to go to and from work in their working clothes.

We are in competition with the manufacturing industries for men. We are faced in this business with a restriction in immigration, but in addition to conserving our labor, and our supply of men by safety measures, we can increase that supply somewhat by inducements. The average construction foreman, perhaps you will agree with me, would scoff at the idea of locker rooms and wash-rooms for workmen on a building construction operation, however large. But I predict that in the near future if we are to compete with manufacturers for labor, on our larger operations, we shall be providing facilities for men.

Assuming that every employer in the construction industry is interested in safety, we may proceed by considering the matter from two different angles, with the earnest desire that this consideration will be of value in establishing safety work more generally in the construction industry.

First: To establish safety it is necessary to sell the idea to the executives and the officials of your company. This has been done very largely, and is being done, by the National Safety Council through its publicity, its meetings and its campaigns in different cities. I think it would be safe to make a statement that perhaps in the construction industry fewer of the executives; fewer of the officials of the companies, have been sold than in other industries. We propose through the A. G. C. and through the continued activities of the Construction Section of the National Safety Council to sell more of the officials, more of the "bosses," this safety idea, because without that it is almost impossible to make much progress in this work.

Secondly: Because safety is the result of a mental attitude, and is a matter of instruction and education, eternal vigilance, and a matter of instinct versus reason on the part of those actually exposed to the hazards, let us review some of the things which can be done to educate and instruct our workmen and keep before them this prime factor of safety; in other words, some of the things that can be done to keep the mental attitude as nearly right as possible.

One of the first suggestions which might be made in this connection is to try to get away from the word "safety." It is an absolute term, somewhat overworked, and does not find favor with the old-school, practical, hard-headed construction man whose experience and training have taught him that in construction work certain chances must be taken. It might be better to label this activity "accident prevention work." Construction work can rarely ever be carried on with total safety, but no one will deny that prevention of accidents on construction work is desirable and practical from every standpoint. Your hard-headed, practical foremen and sub-foremen, at least some of them, will listen to arguments in favor of accident prevention with more patience and less prejudice than to arguments on safety.

In order to be really effective, the idea of accident prevention must mainly filter through to the man subjected to the hazard. So, after all, we have to get back to the foremen on the work, and make the foremen feel the responsibility for the accidents. In order to do that, one certainly must talk to the foremen in the foremen's own language, and it is suggested that accident prevention work will fit the situation with him better than safety work.

Another requisite for the establishment of accident prevention work is to get a report of each and every accident, so as to be able to make a study of how accidents are caused and what they cost. These reports should be tabulated by the standard method adopted by the Construction Section of the National Safety Council, so that comparisons may be made. This matter of reports is important, as these reports furnish the facts upon which a great deal of the work must be planned and done.

Third: Accident prevention work in the construction industry can be materially aided and very much accelerated by close cooperation between insurance carriers and employers. There are in-

numerable ways in which the insurance carriers can help to reduce accidents. Posters, danger signs, and other placards supplementing those furnished by the National Safety Council can be prepaid by your insurance company and distributed. These, if used intelligently, will constantly remind your employees and the public of certain specific dangers on your work, as well as indicate generally to your employees the necessity of such matters as precaution in engaging men for construction work, accuracy in making reports, and other very necessary general requirements.

Fourth: An accident prevention committee composed of your foremen, superintendents, timekeepers, clerks and workmen is another requirement. This committee should meet at least once a month, and discuss freely and openly all of the practical aspects of the work, should review the accident reports, and should make such comparisons as are desired. In this fourth suggestion for establishing safety, the group plan is what we have in mind. An accident prevention committee in the smaller organization is impractical, but in a group organization it is not only very practical but very helpful.

Fifth: Some kind of a set of safe practices or a code should be prepared, preferably by a group of construction contractors in your locality or in your state. This code or set of safe practices should not be too technical, should not be mandatory, but should be very practical, should especially conform with those customs and conditions peculiar to your locality, and should cover those general requirements which will reduce accidents on construction work. In order to be effective, this code should be distributed generously to all of those actually in charge of the operation, after which questionnaires on the code should be sent out periodically to those having the work in charge. This questionnaire would indicate, when answered, the familiarity or lack of familiarity with the code. In order to stimulate this activity, prizes may be offered for the best answers to the queries in the questionnaire, and awards be made to the men. This is one very effective method of compelling your men to think accident prevention.

Unless something of this kind is done, there is a very great danger that the code will not be read. And the construction industry must take the initiative in this matter before legislation is passed in many of the states requiring numerous, impractical, technical, highly detailed and costly measures which will only operate as an added burden to the construction industry, and which are more or less questionably effective as accident prevention measures.

Sixth: Accident prevention work in the construction industry should include a careful, periodic inspection by a capable, impartial, trained engineer, usually known as a safety engineer or inspector. This man must be peculiarly adapted for the work in that he must not incur the enmity of the man actually in charge of the operation, but must demand his cooperation. His requests must not be arbitrary nor too insistent, otherwise he cannot expect to get anywhere near 100 per cent cooperation or results. If he is the right kind of man, and if he has the support and backing of the officials of your company, a great deal of good will result, and a great many accidents will be prevented without added expense, inconvenience or friction in your organization. This safety engineer or inspector should be a member

of the accident prevention committee, should engage in all of its deliberations and activities, and should have a very prominent part in the preparation and the making of the code or set of safe practices for your locality.

Seventh: The more serious accidents and all of the fatal accidents on your work should be subjected to investigation by a board of inquiry composed of a few members of your safety committee. This board should review carefully and impartially the causes leading up to the trouble and report its findings only in such manner as will tend to prevent and avoid a repetition of the accident. This has been found to be of very great value in accident prevention work.

Finally: What the construction industry seems to require is the incentive or initiative to enter vigorously into this activity. We have all acknowledged that it is woefully behind other industries in this work, but we are very much encouraged by the interest and spirit and vigor of the last year, and it only becomes necessary for those of us who know of the necessity and the desirability of this work to continue on and to work harder to convince others in our industry that they *should* become interested—yes, that they *must* become interested in this work.

The difficulty up to this time has seemed to be

to devise a plan whereby the average and the small construction firm can take an active part in this work. It may be taken for granted that the larger concerns are able within their organization to engage to a more or less extent in some kind of accident prevention activities. But it is most desirable that these larger concerns all should come into the Construction Section so that they may derive the benefit of the exchange of ideas and the coordination between their work and that of some other of the larger concerns which cannot be secured in any other way.

Now as to the average, or the smaller, operators. It would seem, after studying this matter for some years, that it is almost necessary that they join or affiliate themselves with some organization which can, in turn, function through the Construction Section of the National Safety Council. Let me suggest that in order to engage in this work the smaller contractors affiliate themselves with some organization, either the local chapter of the Associated General Contractors of America, the Builders Exchange, the Master Masons Association, the local Safety Council of the Board of Commerce, or some other group, for it has been demonstrated conclusively that this accident prevention work can be done very much better in groups than by individuals.

Use of Corrugated Culvert Pipe in Bridge Pier Construction

Several Typical Installations as Well as an Unusual One Described

IN various parts of the country and under varying conditions highway engineers have found it practical as well as economical to use corrugated iron culvert pipe in the construction of bridge foundations or piers. A study of these installations reveals several interesting engineering problems which were solved by this type of construction. Service has proved that the use of this material represents good engineering practice and also that the life of the structure is greatly in-

creased when rust-resisting culvert pipes are used.

Some years ago a bridge was required in Haakon County, S. Dak. E. O. Rush, the Superintendent of Construction of Roads and Bridges for the county, decided that since funds were limited he would employ corrugated culvert pipe for the piers of the required bridge. Lengths of 18-inch galvanized corrugated culvert pipe made of Armco ingot iron were reinforced by riveting two $\frac{3}{4}$ -inch steel rods about 18 inches from the



ONE OF TWO SMALL BRIDGES SUPPORTED BY CORRUGATED IRON CULVERT PIPES, ERECTED NEAR FLAGLER, COLO.



CORRUGATED IRON PIPES USED AS SUPPORTS FOR A 150-FOOT BRIDGE IN BAY CITY, MICH.

top of each pipe, as shown in Figure 1. Two more $\frac{3}{4}$ -inch rods were riveted in the same position at what was to be the footing end of the pipe. Then eight strands of twisted barbed wire were run from the radii of each rod. Mr. Rush considered these strands equal in strength to four $\frac{3}{4}$ -inch twisted square bars, which are often used for reinforcement.

After the pipes were reinforced, they were swung into position. Concrete footings measuring 4 x 4 x 6 feet were then constructed, the sways put in and the cap anchor placed, as shown in Figure 2. When the turnbuckles had been tightened, concrete was poured into the pipes, and when this had hardened, the superstructure was placed.

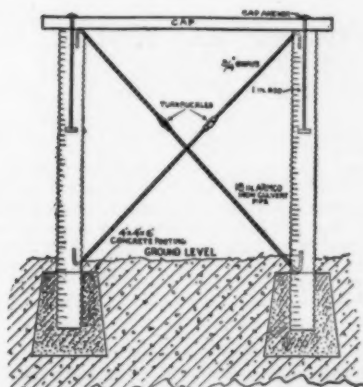
A similar type of construction, but used under different conditions, is found in Kit Carson County, Colorado. The road and bridge commissioners were faced with the problem of making extensive and permanent improvements in the county high-

way system with limited funds. It was necessary to build two small bridges near Flagler, Colo., and after considerable study of ways and means, the commissioners decided to employ corrugated culvert for the bridge piers. In these cases 15-inch diameter Armco culverts were used, with four reinforcing bars to each culvert, instead of the strands of barbed wire employed in Haakon County, S. Dak. By using 2 x 2-inch angle-iron sway braces with $2\frac{1}{2}$ -foot drift bolts for 12 x 12-inch caps, the safety factor was increased. Concrete was poured into the pipes after they were placed on the footings. As may be noted in the accompanying photograph, the sways were run from the outer piers in each set of four piers installed. The footings used varied: in one bridge they measured 8 feet deep by 3 feet wide, and in the other 8 feet deep by 4 feet wide.

County Commissioner G. W. Huntley, who was responsible for these installations, recently re-



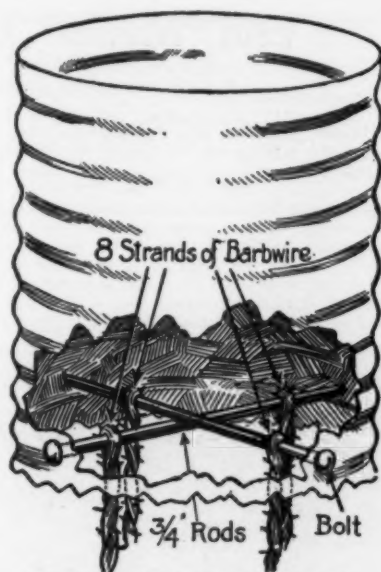
LARGE-DIAMETER CORRUGATED CULVERTS USED AS BRIDGE PIERS ON THE TULE RIVER, TULARE COUNTY, CALIFORNIA



CONCRETE FOOTINGS AND SWAY
BRACES USED ON HAAKON CO.,
S. DAK., BRIDGE

ported that he found this an ideal form of construction for small bridges, as it resulted in a considerable saving in cement and form lumber.

In Bay City, Mich., wooden pilings were driven as far as possible into the river bottom in the construction of a 150-foot bridge. When the pilings were in place, lengths of Armco ingot iron corrugated culvert pipe were slipped over them and forced into the river bottom. The water was then drawn from the space between the pipe and piling, and concrete poured in. This form of construction proved very strong and justified the work of the engineers who designed it to withstand the heavy ice which comes down the river in the spring of the year. The installation was made in 1915 and was in excellent condition when last inspected. Not only had the piers resisted the shocks



METHOD OF REINFORCING IRON CUL-
VERT PIPE FOR BRIDGE PIER IN
HAAKON COUNTY, S. DAK.

of ice impact, but the metal had successfully resisted corrosion. The accompanying photograph of this construction was taken six years after the installation was made. Another photograph shows a similar installation on the Tule River, Tulare County, Calif.

ACKNOWLEDGMENT.—Text and illustrations by courtesy of *Pure Iron Era*, Chicago, Ill.

Vision in Supervision

A SURETY company is authority for statistics recently published which seem to confirm the popular belief that highway construction is a hazardous business venture. It is shown that the losses of bond houses on high-type road construction contracts constitute a large percentage of premiums paid. We assume the figures are correct, although we must confess they depict a far more serious situation than we had believed existed, but what interests us more than any post-mortem figures are the reports received at regular intervals by the U. S. Bureau of Public Roads for the district engineers, which attribute to bad management one out of every four cases of unsatisfactory progress on Federal Aid projects. Only one other cause appears more frequently—the weather.

Neither contractors nor engineers can be ex-

pected to accept responsibility for the weather, although it does appear that a greater amount of time is lost on account of unfavorable weather conditions than there is warrant for in the conditions themselves. It does seem as though the cases ascribed to bad management are distinctly up to the contractors, and the evidence of the Federal Aid report is reinforced by the studies of grading operations recently made by the U. S. Bureau of Public Roads in its monthly magazine *Public Roads*. When it is shown that 100 of the 180 seconds required to load, turn and dump wheelers on an average job represents unprevented preventable delay, one is inclined to the opinion that high construction would be a much less hazardous venture if contractors would put more vision into supervision.

Proper management spells Success.

Koppel Opens New Office

THE Koppel Industrial Car & Equipment Company, Koppel, Pa., has announced the opening of a new sales office in the Rialto Building, San Francisco, Calif., under the management of Harry C. Kraft. This new agency will be known as the Koppel Sales Company, Inc. Both sales and engineering work will be handled from

this office. The engineering work will be under the management of A. E. Prager, and the sales under the direction of Mr. Kraft.

The Koppel Industrial Car & Equipment Company will carry a large stock of material for immediate delivery at its warehouse located at San Francisco, Calif.

Still "Movies" of Trencher at Work

B-G Machine Digs Main Trench and Lateral in Coral Rock

IN Miami, Fla., the John Rollins Company, Inc., recently tackled an interesting trench job in coral rock, which is a peculiar local formation. Coral rock is so hard that it was found that some of the ladder-type trenchers could not operate successfully, as their booms gradually jumped and climbed up to the surface. The Barber-Greene trencher which the John Rollins Company used met almost every obstruction and operated under all kinds of conditions, demonstrating the value of many of the features claimed for this machine by

the manufacturers, the Barber-Greene Company, Aurora, Ill.

The machine was sold with the understanding that the teeth might have to be changed and sharpened daily. The machine dug 180 feet in 4 hours the first day, 290 feet in 6 hours the second day, and 400 feet in 8 hours the third day. The teeth were taken off for sharpening at the end of 1,000 feet of digging.

The series of still motion pictures reproduced with this story tells a very interesting tale.



STILL MOVIES OF A SOUTHLAND DITCHING JOB

Top left—At 2:10 P. M., ditcher encounters pole on line and operator throws out traction clutch and starts the power lift of the boom. Top right—At 2:13 P. M., as soon as the boom cleared the ground, the operator started the crawlers, swung sharp to the left, and is now headed for position on the line the other side of the pole. Left center—At 2:15 P. M. Operator has straightened out and is sinking the boom vertically at the rate of a foot a minute. Five minutes of time only were lost, because while the boom is going down, it is making 32 inches of new trench. The whole move was made in a space 20 feet x 8 feet. Right center—At 2:35 P. M. The operator has his automatic traction set for one foot per minute and is now 20 feet down the line. The gap left for hand excavation taped just 12 feet, 6 inches, but is accessible from both ends. Bottom left—With the spoil conveyor on the left as shown the machine is about to interfere with the porches. The helper winds a winch which throws the conveyor to the opposite side and with his fingers changes a spacer yoke in the gear so as to reverse the direction of the drive. Right bottom—The conveyor is now shifted and passing the porches with several inches to spare. It now becomes necessary for the helper to restake the line every ten or 15 feet lest the spoil bank cover it

Legal Points for Contractors

These brief abstracts of court decisions in the contracting fields may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt, consult your own lawyer

Edited by A. L. H. Street, Attorney-at-Law

Contractor's Delay as Excuse for Contract Cancellation

The principle that mere delay in the performance of a contract by one party does not justify rescission of the agreement by the other party was lately recognized by the Kentucky Court of Appeals in the case of *Reid v. Wilder*, 264 Southwestern Reporter, 849.

When Lien for Materials Cannot Be Enforced

The general rule that where an owner settles with a contractor without actual or record notice that the contractor is indebted to a materialman, no lien can be enforced by the materialman against the property improved by the contractor, was lately applied by the North Carolina Supreme Court in the case of *Rose v. Davis*, 124 Southeastern Reporter, 576. The Court said:

"Where the original contractor has been paid in advance, or when the owner has settled with him in full prior to notice of any claim from a laborer or materialman for work done or material furnished and not paid for, there is no provision in the statute whereby a subcontractor may acquire a lien for the value of such claim. And while this may work an apparent hardship in some cases, it would doubtless prove more hurtful in general if the law were otherwise. . . . Objections readily suggest themselves. Suppose, for example, a contractor wanted to pay a debt by building a house for his creditor. Would the law deny him this privilege? Liens are given to subcontractors and those who furnish labor, materials and supplies, to the end that they may force collection from their debtor, the original contractor, and not for the purpose of rendering the owner primarily liable for such claims, except where proper notice has been given before settlement with the contractor."

Hours of Labor on Public Works

The right of a state to regulate the hours of labor of employees of contractors engaged in doing work for the state or its political subdivisions, was reaffirmed by the Oregon Supreme Court in the case of *Turney vs. J. H. Tillman Company*, 228 Pacific Reporter, 933.

The Oregon law provides that where labor is employed on public work, either directly or through a contractor, no employee shall be required or permitted to work more than eight hours in a day nor more than 48 hours in any one week, excepting in absolute emergencies, when double pay for overtime shall be allowed.

The validity of the provision was not questioned in the cited case, a suit brought to recover overtime allowance for services as truck driver on state highway paving work, but it was held that plaintiff waived any right to overtime allowance.

The following are the most important observations made by the Court in the course of its opinion:

"The act in question was passed to discourage employers in arbitrarily working laborers overtime on public works under penalty of discharge if objection is made to so working. It is obviously to preserve the health and efficiency of laborers on public works, and also to provide employment in the event of any 'necessity, emergency or public policy' in case of such necessity when 'other labor of like skill and efficiency which has not been employed full time is available.' The provision of the statute where there is a necessity or emergency, or where the public policy absolutely requires laborers to work overtime, that the person so employed shall receive double pay for such overtime, is evidently intended as a deterrent to check an employer requiring such laborers to work overtime. . . .

"Usually a person may waive by agreement the benefit of a statutory provision. But there is an exception to this general rule in the case of a statutory provision whose waiver would violate public policy expressed therein, or where rights of third parties which the statute was intended to protect are involved."

Coverage of Workmen's Compensation Laws

Where a carpenter is employed generally by a construction company he is protected by the local workmen's compensation law while working on the residence of the company's manager under directions from his foreman, holds the New York Court of Appeals in the case of *Jaabek vs. Theodore A. Crane's Sons Company*, 144 Northeastern Reporter, 625.

Employer's Duty as to Safety of Staging

Where an employer undertakes to provide staging upon which an employee is to work, he must use reasonable care to see that the staging is reasonably safe for the purpose for which it was intended, held the Vermont Supreme Court in the case of *Miller vs. Dunton*, 126 Atlantic Reporter, 492. The Court remarked:

"The liability of this master cannot be determined by the mere fact that the place where his servant was injured was a staging. The essential question is whether the former assumed to furnish the staging as a completed structure, or only undertook to provide the necessary materials for his servants to use as they pleased. As we have seen, the evidence was that the defendant agreed to furnish, and did in fact erect, the stagings, and the rule of the law in such cases is that it is the duty of the master to use due diligence to see that the structure is reasonably safe for the purpose for which it is intended; and he cannot escape liability for the negligent performance of this duty by delegating its execution."

Various Classes of Services and Materials for Which Liens May Be Enforced

The opinion cited in the preceding opinion affords an interesting study of what some of the courts have decided concerning the lienable character of different indirect contributions to the construction of buildings and improvements. The Illinois Supreme Court makes this summary of decisions:

"An example is afforded by the services of an architect, in drawing plans and specifications, who was unable to maintain a lien therefor until an express provision of the statute authorized the lien. [Citing Illinois decisions.] . . .

"Appellant argues that the case of *Rittenhouse & Embree Co. v. Brown & Co.* [98 *Northeastern Reporter*, 971] . . . is not in point; that the lumber for which a lien was there denied [before the Illinois law was so amended as to authorize a lien] was only used temporarily for concrete molds and forms, and while depreciated in value by such use, was taken away by the contractor, and that therefore the case is readily distinguishable from the authorities of other jurisdictions, which allow a lien where material, though employed as a means in the process of construction, is consumed in such process, and upon that theory is held to have entered into the construction of the improvement. Cases are cited in which, on the same theory, a lien was allowed for coal furnished in heating and drying a building [Nebraska] . . . for gunpowder used in preparing ground for the building of an aqueduct [Massachusetts] . . . for dynamite used in blasting ground for a railroad [New York] . . . for explosives used in excavating tunnels through rock [Tennessee] . . . and for lumber, so far as consumed in the construction of a cofferdam to hold back water during the building of a permanent dam [Wisconsin] . . . These authorities, while very instructive, are not necessarily persuasive. The provisions of mechanic's lien statutes of other states vary from our own. . . . Usually, the courts in those states have not applied . . . the rule of strict construction in the interpretation of those statutes."

Claim for Furnishing Heat for Building Under Construction Held Not Lienable

Interpreting the Illinois Mechanic's Lien Act, the Supreme Court of the state recently concluded that it will not support a lien claim for furnishing temporary heat for a building under construction, although furnished to protect plaster and cement work. (*Hoier vs. Kaplan*, 145 *Northeastern Reporter*, 243.) The Court remarked:

"This court has uniformly held that the statute relative to mechanics' liens is in derogation of the common law, and that it must be strictly construed. . . .

"Section 7 of the Mechanic's Lien Act, as amended in 1913, permits the enforcement of a lien, within certain limitations, if 'it is shown that such material was delivered either to said owner or his agent for such building or improvement, to be used in said building or improvement, or at the place where said building or improvement was being constructed, for the purpose of being used in construction or for the purpose of being employed in the process of construction as a means for assisting in the erection of the building or improvement in what is commonly called forms or

formwork where concrete, cement or like material is used, in whole or in part.' The words 'to be used in said building or improvement,' and 'for the purpose of being used in construction,' have a more direct and immediate relation to the improvement than do the words 'for the purpose of being employed in the process of construction as a means for assisting in the erection of the building,' etc. 'Used in said building or improvement' and 'used in construction' denote use as a part of the construction, so that the material becomes a part of the completed structure. . . . The words 'used in the process of construction' were not in the act before the amendment of 1913, and are specifically limited to 'forms or formwork where concrete, cement or like material is used.' These words do not enlarge the act to cover any other means employed in the process of construction. Labor indirectly employed, unless it be upon forms put to the specified use, will not give rise to a lien."

Notice of Injury Under Workmen's Compensation Act

Upholding an employee's right to an award under the Kentucky Workmen's Compensation Act, the Court of Appeals of that commonwealth lately said in the case of *Bates & Rogers Construction Company vs. Emmons*, 265 *Southwestern Reporter*, 447:

"No written notice was given by appellee [the injured workman] at any time, but the claim for compensation was made within one year after date of accident. By the express provision of the statute, want of notice is not a bar to the proceeding, if the employer or his representative had knowledge of the injury, and the officer or agent of the corporation of the business at the place where the injury occurred is a representative of the corporation for this purpose."

Cost-Plus Contractor as Agent of the Owner

An agreement by a contractor to furnish labor and materials for a building on a cost-plus basis made him agent for the owner in such sense as to bind the latter for materials bought for the work, held the Texas Supreme Court in the case of *Gilbert Manufacturing Company vs. Connellee*, 265 *Southwestern Reporter*, 375. And the Court concluded that it made no difference that the cost of the structure exceeded the maximum fixed in the construction contract. The opinion says:

"We are of the opinion that the Holmboe Company [the contractor] in purchasing the doors, windows, and hardware, which were used in construction of the building, was acting as the agent of the defendant in error [the owner], and that by the terms of the contract he agreed to pay for all material furnished."

"While the contract provides 'that in no event is the owner to pay more than the contract price for the building unless as elsewhere provided,' Connellee had his architect present who could at any time require the contractor to furnish satisfactory evidence that all bills for material furnished and labor performed had been paid. He had made ample provision in his contract to keep advised as to the cost of material and labor. The fact that the building cost Connellee about \$25,000 in excess of what he and his contractor had agreed it should cost affords no reason why he should not pay for the material purchased by his agent and used in the construction of his building."

Combined Haulage on Concrete Road Job

Contractor Finishes Road in Good Time Under Adverse Weather Conditions

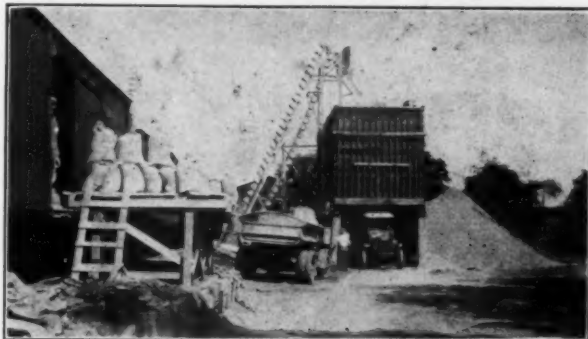
LAST summer the Mellert and Weidener Company of Medina, Ohio, under very adverse weather conditions successfully completed 2.4 miles of 16-foot concrete road, under contract from the State Highway Department. The success attending this work was due largely to the use of the combined system of haulage, using both trucks and light railway equipment.

Inasmuch as this work was executed during a very wet spell, from June 7 to July 20, and an unusually heavy rain fell at the time of the Lorain cyclone, with its costly delays to contractors of the district, it merits particular attention. Mr. Mellert states that, estimating very conservatively, he could not have operated 50 per cent of the time with only truck haulage. In spite of the successive rainfall, the only delays were caused by the rejection of stone from the quarries. The stone delivered was covered with mud, caused by the flooding of the quarries.

The first 1½ miles of the road were built from the industrial track. Before this was completed, part of the road had undergone a 21-day curing, and trucks were allowed on the finished pavement. The tracks alongside the finished road were moved up ahead and the transfer point moved at the same time. Each day after the first moving of track, the transfer point was moved ahead about 500 feet, which was the average daily run. This operation was repeated until a point 1½ miles from the end of the job was reached. From there on, the transfer point was stationary, and the job was finished from the industrial track.

The minimum haul for the truck was about one mile, this being the distance from the proportioning yard to the beginning of the job. The maximum haul for the trucks was two miles. An average of four 5-ton trucks were used, three at the minimum haul and five at the maximum haul. This equipment furnished the mixer with 40 batches per hour.

The trucks each carried four steel batch-boxes



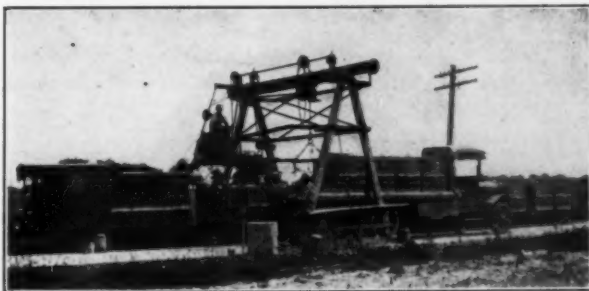
CENTRAL PROPORTIONING PLANT, SHOWING CAR UNLOADER, BINS AND CEMENT PLATFORM

with water-tight cement compartments, which were loaded at the material yards, the stone and sand from bins, and the cement from cars. A cement storage shed for 2,000 barrels was provided, and when conditions required, cement could be loaded from the shed. The stone bin had a capacity of five cars. A Columbus unloader was used to unload and elevate stone into the bin. The sand-bin had a capacity of one-half car, and a Galion unloader was used. The loading of the four batch-boxes required five minutes. The personnel at the material yard comprised five men handling cement and four men handling stone and sand.

The loaded batch-boxes were hauled to the beginning of the job and then transferred to the narrow-gage cars and hauled to the mixing plant. The equipment used for transferring was built by the contractors. From a steel I-beam supported by two wooden A frames on each side of the road, a Yale and Towne hoist was hung. The operating power was a Ford engine mounted on a platform on one side. The three operating pedals of the Ford, on which levers were fastened, formed the control. When the transfer was moved ahead, a truck was backed underneath, the transfer raised and carried on a 6 x 6 timber across the bed of the truck. This operation was simple and quick and the whole machine could be moved very readily. The apparatus complete cost about \$1,000.

To transfer four batch-boxes from the trucks to the road car required about 5 minutes. Two men on the transfer bale and two men placing boxes on the cars and shifting the cars were necessary.

On the first half of the job one locomotive hauling seven cars with two batches each easily supplied the mixer at the rate of forty batches per hour. On the last half of the job a 5½ per cent grade was encountered and two locomotives were used. Here the



THE TRANSFER POINT WHERE BATCH-BOXES ARE SHIPPED FROM THE TRUCKS TO INDUSTRIAL RAILWAY



INDUSTRIAL RAILWAY DELIVERING PROPORTIONED AGGREGATE AND CEMENT TO MIXER

split-team method was used. The cars were coupled up three in front and three in the rear of the locomotive. When the grade was reached, the three rear cars were left at the bottom, and the three in front pushed up the hill. The locomotive left these and returned for those at the bottom. On top of the grade the six cars were coupled together again. One locomotive could make the grade with five or six cars, but the running time was cut down, and in order to supply the necessary batches, another locomotive was put on. At first, this locomotive was used to switch cars at the mixer and to make an occasional trip when required. Later, the above-ex-

plained method was used, as this relieved the strain on one locomotive and divided the burden equally between two. Two locomotives and four trains of six cars each were used, the locomotives switching from loaded to empty trains at the mixer and at the transfer point.

Two locomotive operators made up the train crews. It took four men from two to three hours to take up and relay 500 feet of track. When the track sections were loaded on a car, a locomotive would haul the car from one end to the other. One man was detailed continually on track maintenance. The contractor figured it cost about \$150 per mile to lay and take up track. This includes the three switches.

The paver was loaded with 5-bag batches of 1:1½:3 mix. Besides the operator and fireman, four men were required to handle batch-boxes from the cars to the skip and to shift the cars. Behind the mixer five men did all the work. Three spread the concrete and placed the circumferential reinforcement, one man operated a mechanical finisher, and one man acted as helper to him. With the use of a subgrader, seven men with a foreman were able to set all forms and keep the subgrade ahead of the paver. The contractor used Lakewood Engineering Company industrial track, batch-boxes and road cars, Plymouth locomotives and a Lakewood finisher and subgrader.

News Notes

New Holt Distributors

THE Holt Manufacturing Company, Peoria, Ill., has announced the appointment of the Brockway Motor Truck Company, Utica, N. Y., as its distributors for Caterpillar tractors in central and northeastern New York State. Complete stocks of 2-ton, 5-ton and 10-ton Holt Caterpillar tractors, as well as service parts, will be carried in Utica, and a corps of experienced service operators will be available.

Draney to Market Asphalt Products

J. R. DRANEY, formerly General Sales Manager of the U. S. Asphalt Refining Company, New York City, has announced that he has established himself to market asphalt and allied products, including Bitoslag, Kolmend and Surfacerite. His address will be 90 West Street, New York City.

Loew New Advertising Director for Truscon Steel

THE Truscon Steel Company, Youngstown, Ohio, has announced that Oscar W. Loew, has assumed charge of the advertising and sales promotion work of that company. Mr. Loew has been well known in advertising circles for many years and has had a wide experience in merchandising and marketing.

New Distributing Warehouse for Wire Rope Company

THE Williamsport Wire Rope Company, Williamsport, Pa., has announced that Wortham, Texas, has been selected as a new distributing center for Williamsport wire rope. A new warehouse has been opened at this point as a part of the Williamsport policy to establish new distributing centers as rapidly as conditions warrant. This branch will be under the general supervision of H. R. Gruber. The main distributing warehouse is located at Tulsa, Okla. The Wortham branch is under the direct supervision of E. A. MacKenzie.

Sparks Joins Northwest Sales Staff in Philadelphia

THE Northwest Engineering Company, 28 East Jackson Boulevard, Chicago, Ill., has announced that E. L. Sparks has joined its sales staff in the Philadelphia territory. Mr. Sparks was employed for a number of years by the McGraw-Hill Company and later by the Erie Steam Shovel Company. This last year he has devoted to serving the Ohio Locomotive Crane Company, and through the breadth of this experience Mr. Sparks has acquired a practical knowledge, making him competent to advise on construction, material-handling and excavation problems.

Are These in Your Files?



The catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up-to-date on the subject of machinery and equipment.

ELECTRIC PORTABLE HOISTS

For use where air is not available for pneumatic hoists, the Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill., has built a new line of single- and double-drum portable electric hoists for construction jobs. These are described in Bulletin No. 76-E.

LIME MORTAR FOR BRICK WALLS

In an illustrated folder, "The Binder in Your Wall," issued by the National Lime Assn., 918 G. St., N. W., Washington, D. C., contractors will find a great deal of helpful information regarding the use of lime mortar and how it cuts down the cost of brick work.

STEEL CONSTRUCTION

The American Institute of Steel Construction, 350 Madison Ave., New York City, will be pleased to send to readers of CONTRACTORS' & ENGINEERS' MONTHLY who are interested in steel construction its booklet on this subject, covering an explanation of formulae, standard specifications for the design, fabrication and erection of structural steel for buildings, and a code of standard practice.

FLUES AND FLUE LININGS

A 32-page book has just been released by the Eastern Clay Products Assn., Colonial Trust Bldg., Philadelphia, Pa., under the above title, containing related data on chimneys and fireplaces. It includes drawings and tables of recently adopted standard sizes of round and rectangular fireplace flue linings, as well as special tables and specifications for the construction of chimneys. The price of this book is 50 cents to the general public, but engineers, builders, contractors and others requesting copies on their letterheads may obtain them without charge.

A POSITIVE MECHANICAL HOIST

The new Heil mechanical hoist, which gives a dumping angle of 65 degrees, has high tail-gate clearance and positive mechanical operation, with other features of interest to contractors, is described in detail in literature which may be secured free from the Heil Co., Milwaukee, Wis.

A NEW TYPE GASOLINE-POWERED EXCAVATOR

The new Type C Insley excavator, which is a gasoline-powered machine for shovel, ditcher, crane and skimmer scoop work, is described in the literature of the Insley Mfg. Co., Indianapolis, Ind.

CRAWLING TRACTION CRANES

Industrial locomotive cranes with crawler traction treads built to give a longer life of service under the hardest usage, are described in the literature of Industrial Works, Bay City, Mich.

A HIGH-SPEED SINGLE-BATCH TRUCK

The Constructor is a high-speed single-batch motor truck made by the United Motors Products Co., Grand Rapids, Mich., and described in its literature, which will be sent free to contractors. This literature contains extracts from letters received from contractors showing the value of this motor truck for road contractors' service.

A ONE-BAG MIXER BUILT OF STEEL

Over 10,000 contractors are using the Boss one-bag steel concrete mixer and are finding it satisfactory. The new price list and complete catalog of the American Cement Machine Co., Inc., Keokuk, Iowa, describes this mixer, as well as the alley and street paver and trailer mixers.

THE VALUE OF ONE-TON TRUCKS

The service which contractors are getting out of Ford one-ton trucks is told in literature which you may secure from the Ford Motor Co., Detroit, Mich., without charge and which you will undoubtedly find very helpful.

A CONTRACTORS' TRANSIT

Folder ZA-27, just issued by the Warren-Knight Co., 136 N. 12th St., Philadelphia, Pa., describes the Sterling contractors' model transit No. 27, which has justified its approval by contractors as a convenient and accurate instrument.

WOOD OR STEEL MECHANICAL SUBGRADERS

The advantages of mechanical subgrading in reducing labor, producing a true subgrade and insuring against the waste of concrete are described in an interesting manner in the recent literature of the Lakewood Engineering Co., Lakewood, Ohio.

A SIMPLE FORM CLAMP

The Bullis form clamp is a simple device which effectively holds both square and circular column forms and wall forms in place. It is described in an illustrated bulletin by the manufacturers, the Washington Steel Form Co., Woodward Bldg., Washington, D. C.

A FOOT-VALVE AND QUICK-CLEANING STRAINER

Contractors will be interested in the Emerson foot-valve and quick-cleaning strainer, which makes it possible to free the pump suction of any obstruction in a moment. This outfit is described in full in the literature of the Emerson Pump & Valve Co., Inc., Alexandria, Va.

FOUR- AND SIX-CYLINDER INDUSTRIAL MOTORS

The Beaver Mfg. Co., 35 25th St., Milwaukee, Wis., will be pleased to send its literature describing the new four- and six-cylinder 6 x 7 Beaver motors, designed to meet the demand for dependable gasoline motors of from 70 to 130 horse-power in the contracting field.

A HIGH-CAPACITY TRAILER

An 8-wheel trailer capable of carrying from 30 to 35 tons, which may be used for hauling large traction shovels and pavers at reasonably high speed, is described in detail in literature which may be secured from the Highway Trailer Co., Edgerton, Wis.

A LIGHT-WEIGHT 14-CUBIC-FOOT MIXER

The Construction Machinery Co., Waterloo, Iowa, has recently issued a very interesting illustrated catalog covering the Wonder-14 mixer, a light-weight, sturdily built machine, as well as its other models. Contractors may secure this catalog free on request.

CENTRIFUGAL AND DIRECT-ACTING PUMPS

The American Steam Pump Co., Battle Creek, Mich., has issued a brief catalog listing its entire line of American-Marsh centrifugal and direct-acting pumps for municipal and contracting service.

AN 18-TON GASOLINE LOCOMOTIVE FOR HEAVY CONTRACTING WORK

The Fate-Roth-Heath Co., Plymouth Locomotive Works, Plymouth, Ohio, has brought out its new model HL 18-ton 4-speed gear-driven gasoline locomotive, capable of handling trains and freight cars or construction equipment. This is described in literature which may be secured free on request.

WELL-BALANCED WHEELBARROWS

Bulletin 35, issued by the Sterling Wheelbarrow Co., Milwaukee, Wis., depicts the many standard types of Sterling wheelbarrows for specific services and tells exactly why Sterling wheelbarrows wear longer and are easier to push.

A CONTINUOUS TREAD FOR POWER SHOVELS

The Thew Shovel Co., Lorain, Ohio, has issued a 16-page booklet describing its new center-drive truck for power shovels, which has many distinct advantages.

A 2½- TO 3-TON TRUCK FOR CONTRACTORS

The new Harvey 2½-3-ton contractors' truck, with a two-range transmission giving seven speeds forward and two reverse, designed for low operating cost, is described in the literature of the Harvey Motor Truck Works, Division of William E. Dee Company, Harvey, Ill.

A PORTABLE ELECTRIC CIRCULAR SAW

The Skilaw, a one-man portable electric saw running on alternating or direct current at 110 or 220 volts and able to cut to 2 inches in hardwood or equivalent material, is described in the literature of the Michel Electric Hand Saw Co., 166 E. Grand Ave., Chicago, Ill.

BETTER TRACTION FOR FORDSONS

Tractor-Grip all-steel wheels, which make it possible for Fordson tractors to supply power for all kinds of road work at much lower expense, are described in the literature of the Tractor-Grip Wheel Co., 4082 Detroit Ave., Toledo, Ohio.

A NEW 4- TO 5-TON ROAD ROLLER

The new Monarch Cub road roller, powered with a Fordson tractor and equipped with a leveler and scraper and scarifier is described in Bulletin K.C.M., which may be secured from the Good Roads Machinery Co., Inc., Kennett Square, Pa.

AN AUTOMATIC DUMP BODY

An all-steel automatic dumping body, which is reinforced at each end with angle-iron and which dumps when loaded by a slight forward pull of the dumping lever, is made for Ford, International, Indiana and Service trucks. It is described in full in literature of the Superior Boiler Works, Inc., Marion, Ind.

A PORTABLE DOUBLE-DRUM HOIST

The Beach 18 and 40-horse-power double-drum hoists, made by the Beach Mfg. Co., Charlotte, Mich., are described in detail in a folder which may be secured from the above company.

A PORTABLE ELECTRIC SANDER

A portable electric sander which, it is claimed, will finish a day's hand work in one hour and in which the depth of cut is easily regulated, and which will remove varnish from old work without gumming the paper, is described in full in an illustrated folder which may be secured free from R. L. Barker & Co., 642 W. Washington Blvd., Chicago, Ill.

REPLACEMENT RADIATOR FOR ONE-TON TRUCKS

The Racine Perfix radiator, a Ford replacement radiator with unbreakable heavy-gage bronze tanks, top and bottom, is described in the literature of the Racine Radiator Co., Racine, Wis.

A LIGHT-WEIGHT INDUSTRIAL CRANE

A new light-weight industrial crane with interchangeable attachments for use as a shovel or dragline has recently been developed by the Speeder Machinery Corp., Fairfield, Iowa, and is described in full in its latest literature.

STEEL MORTAR MIXING BOXES

The Helzel Steel Form & Iron Co., Warren, Ohio, has issued a circular, No. 24 MB, describing its new steel mortar mixing boxes, which make clumsy, leaking, wooden boxes obsolete.

A DOUBLE-DRUM HOIST FOR CONTRACTORS

The Novo Engine Co., Lansing, Mich., will be pleased to send to any interested contractors descriptions of its new LH double-drum hoist with reversible two-speed rope sheave unit, which is a self-contained attachment operating independently of the drum.

A TWO-BATCH ROAD TRUCK

A new two-batch road contractors' truck with pneumatic tires and two-range transmission has been developed by the General Motors Truck Co., Pontiac, Mich., and is described in full in its latest literature.

A NEW GAS-ENGINE-OPERATED BACKFILLER

A new one-man high-quality backfiller with a working speed of 130 feet per minute and a return speed of 275 feet per minute is described in the literature of the Harnischfeger Corp., formerly the Pawling & Harnischfeger Corp., Milwaukee, Wis.

DESIGN AND CONTROL OF CONCRETE MIXTURES

The Portland Cement Assn., 111 W. Washington St., Chicago, Ill., in a new publication which may be secured free by engineers or contractors that are interested, describes a method of producing concrete of predetermined strength.

A BACK-DUMP DRAGLINE BUCKET

A 32-page illustrated booklet recently issued by the Mansfield Engineering Co., Indianapolis, Ind., describes its Pioneer back-dump slackline bucket, which has many features of interest to contractors. This booklet also describes the company's complete gravel plant and miscellaneous equipment.

CUTTING AND WELDING EQUIPMENT

Smith's Inventions, Inc., 2619-2633 Fourth St., S. E., Minneapolis, Minn., has just published a new folder describing and illustrating the welding and cutting equipment which it manufactures.

SAFETY IN THE USE OF EXPLOSIVES

Free copies of a very interesting and instructive paper, "Safety in the Use of Explosives," may be secured by writing to N. S. Greensfelder, Hercules Powder Co., Wilmington, Del.

MOLDS FOR CASTING CONCRETE BRICK

An efficient outfit by which one man can make 40,000 concrete brick per day and make them better, is described in the latest literature of the Zagele Meyer Cast Stone Block Machinery Co., Bay City, Mich.

A GOVERNOR FOR FORDSONS

In a folder, "Steady Power from your Fordson with a Saving of Fuel," the Pickering Governor Co., Portland, Conn., describes in detail its governor and the many advantages of this governor for use with Fordson tractors.

DIRT MOVING AND LOADING

In a very helpful booklet, "Contracting with Barber-Greenes," issued by the Barber-Greene Co., 485 W. Park Ave., Aurora, Ill., contractors will find a great deal of helpful information regarding the loading of trucks and industrial cars and the quick transfer of material from subgrade to transportation unit.

BUILDING BETTER ROADS

A 40-page illustrated booklet, "Out of the Rut," Form No. 708, has been issued by the C. L. Best Tractor Co., San Leandro, Calif., in an effort to help municipal officials and contractors to appreciate the value of tracklaying tractors as motive power for road machinery, both for road construction and maintenance.

GASOLINE-DRIVEN TWO-DRUM HOISTS

The illustrated literature of the American Mfg. & Engineering Co., Kalamazoo, Mich., describes the American Triumph gasoline hoist, as well as its belt-driven unit and cableway excavator.

INDUSTRIAL LOCOMOTIVES ON FORDSONS

The Adamson locomotive, which has reduced haulage costs for many contractors and which uses the Fordson tractor as its motive power, is described in the literature of the Adamson Motor Co., Birmingham, Ala.

A GASOLINE HOIST WITH FORDSON MOTOR

The new Flory gasoline hoist built with single or double drum, or three drums, with or without swinging gear, and powered with a Fordson engine, is described in Bulletin 105 issued by Ralph B. Carter & Co., 150 Chambers St., New York City, describes the complete Humdinger line of contractors' power force pumps for road building and general service. Bulletin 103 describes Humdinger diaphragm force pumps.

HELPS FOR PNEUMATIC TOOL USERS

A monthly folder, "Profts," is now being issued by the Dallett Co., 165-189 W. Clearfield St., Philadelphia, Pa., which will be pleased to send it to users of pneumatic tools interested not only in bettering the quality of their work and increasing its volume, but improving the financial side of their operations.

CONTRACTORS' UNLOADING EQUIPMENT

In Bulletin No. 40 recently issued by the Fairfield Engineering Co., Marion, Ohio, contractors will find a wealth of information regarding unloaders, elevators, storage bins, etc., for the handling of sand and gravel from gondola cars.

STEEL BINS AND BATCH-MEASURING HOPPERS

The literature of the Butler Bin Co., Waukesha, Wis., describes its complete line of portable steel bins and measuring hoppers, which are most effective on concrete road work.

A PUMPING GUIDE

Bulletin 25-G issued by the Domestic Engine & Pump Co., Pittsburgh, Pa., is a veritable pumping guide, containing information regarding the economy of gasoline pump units, general rules for installing pump units, and other information of interest and help to contractors.

MOTORS FOR CONTRACTORS' MACHINERY

In its latest 64-page catalog, the Waukesha Motor Co., Waukesha, Wis., gives complete information regarding the various types of gasoline motors it manufactures for furnishing power for contractors' machinery as well as trucks and tractors.

ALL-STEEL TRACTOR DUMP TRAILERS

All-steel tractor dump trailers which carry 5 yards of dirt or gravel, and two of which trailed behind a 10-ton tractor will move as much earth as can be handled by seventeen mule teams in the same length of time, are described in the latest folder issued by the La Plant-Choste Mfg. Co., 3315 First Ave., Cedar Rapids, Iowa.

COMPACT, RIGID STEEL JOIST TRUSSES FOR FLOOR CONSTRUCTION

Rivet-Grip steel joists, which are compact and right trusses for fire-safe floor construction and which have the inherent strength and economy of the steel truss, are described in the literature of the Rivet-Grip Steel Co., 2735 Prospect Ave., Cleveland, Ohio.

A NEW MODEL MOTOR TRUCK

The new Republic Model 19, Third Series, 3-ton capacity motor truck made by the Republic Motor Truck Co., Inc., Alma, Mich., is replete with vital improvements in design and construction. It is described in literature which may be secured free on request.

TWENTY-FIVE YEARS OF TRUCK VALUE

In "The Albatross," The White Company, Cleveland, Ohio, traces the history of motor truck transportation as developed in its 25 years of service to municipalities and contractors. This historically interesting illustrated booklet may be secured free on request.

RAIL BENDERS FOR INDUSTRIAL TRACKS

The Engineering Products Co., Peoples Gas Bldg., Chicago, Ill., has issued a folder describing its rail benders, which are particularly useful in straightening industrial tracks on road jobs.

Small 4-Cylinder Motor Develops 10 Horse-Power

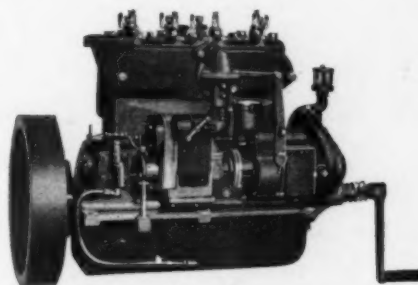
Engine Designed and Built for Industrial Work Has Standard Accessories

THE new Universal Flexifour industrial type engine, featured in the exhibit of the Universal Motor Company, Oshkosh, Wis., at the Chicago Road Show, is a small 4-cylinder engine with a bore and stroke of $2\frac{3}{4}$ inches by 4 inches. The engine develops from 5 to 10 horsepower in the speed range of 650 to 1,200 r.p.m.

The engine is designed and built with the idea of making it particularly adaptable to industrial work, and provisions have been made for various equipment, such as different type bases, radiator and fan cooling systems, disc clutch and reduction drive, which makes the engine adaptable for practically any kind of industrial work coming within its capacity. Standard equipment consists of a Bosch AT-4 magneto ignition, built-in fly-ball type self-oiling governor, Zenith carburetor, muffler and fly-wheel.

Three different models of the Flexifour engine were exhibited, as well as the Universal 4-kw. electric plant and the Universal 3 x 4-inch engine-driven centrifugal pumping unit.

The 4-kw. electric plant consists of the Flexifour engine direct-connected to a 4-kw. generator, especially designed for use in connection with the engine. The engine is equipped with bell housing and the generator frame is bolted directly to the bell housing. The standard equipment consists of the accessories mentioned above for the engine, and, in addition, fuel tank, Stewart vacuum tank



A FLEXIFOUR ENGINE UNIT

and switchboard, all mounted, making the unit compact and self-contained.

The Universal centrifugal pumping unit consists of the Universal Flexifour engine direct-connected to a 3-inch discharge, 4-inch suction, centrifugal pump, which has a capacity of 265 gallons per minute against a total head of 55 feet. The unit as exhibited was equipped with radiator and fan cooling systems, fuel tank mounted, and the complete unit mounted on a 4-wheel hand truck. It should make a very acceptable unit for many contracting jobs.

New Road Pump for Big Pavers

Two Portable Units Capable of Supplying 21-E Mixer

THE exhibit of the Ralph B. Carter Company, 132 Chambers Street, New York City, at the Chicago Road Show, consisted of its 3- and 4-inch diaphragm force pumps of both the open and closed types with rubber ball valves, which practically eliminate clogging and have

longer wear than the older type of valves. This type of pump has quick cleaning features, removable bearings, and enclosed gears running in oil, some of which are new features in this year's type.

The special feature of the exhibit was the new Humdinger road pump, which has been designed particularly to furnish water to a road mixer. A tie-up of a 21-E paver crew for an hour or two is an expensive holiday. Taking the 21-E water requirement as 50 gallons per minute, this new unit provides one-half the required volume against 400 pounds pressure. Thus with two portable units these pumps can force water through $7\frac{1}{2}$ miles of $2\frac{1}{2}$ -inch pipe and adequately supply the mixer. This is sufficient to take care of practically all paving jobs. The insurance against breakdown is increased 100 per cent, because if anything should happen to either pump or engine, and one unit is put out of service, the paver can still be operated at a moderate pace on 25 gallons of water per minute.

The pump end of this new road pump is virtually an upside-down triplex pump built on the automobile engine principle. Instead of the open overhead gears and bearings of the old-fashioned triplex, depending for lubrication on oil and grease cups, all of the driving mechanism is completely encased and running in oil. A special arrangement of the pump valves provides a straight, uninterrupted flow of water through the cylinder,



PORTABLE PUMP FOR ROAD CONTRACTORS

with no reversal of flow, thus increasing the efficiency of the pump very materially, as compared with a standard triplex. Because of the design, only one small casting, that at the very top of the pump, is under pressure, and as a result the total weight of the pump is about one-quarter that of a standard pump of this type for the same capacity and pressure. A simple but effective arrangement prevents any water leakage into the oil reservoir

at the base.

The pump is driven by a new two-cylinder vertical type AB Fuller & Johnson 8-horse-power engine, which is completely pressure lubricated throughout. The entire unit is mounted on an all-steel truck, and has as accessories a specially designed Humdinger air chamber, a sand trap, a brass relief-valve, check-valves on suction and discharge sides, and a 600-pound pressure gage.

A Machine That Bores Holes and Sets Poles in Solid Rock

Interesting Development in Machine Being Used by Contractors and Public Utilities

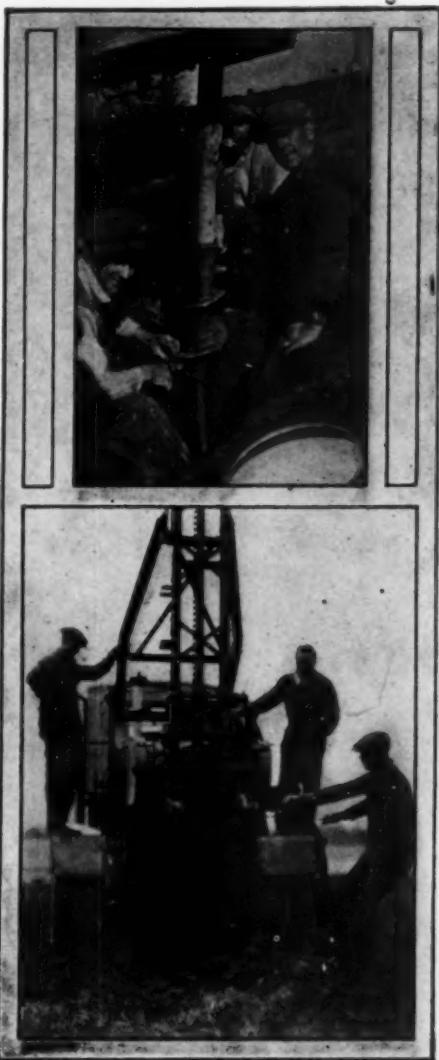
BORING holes through solid rock is the latest achievement of the FWD earth-boring machine made by the Four Wheel Drive Auto Company, Clintonville, Wis. This machine has heretofore been known only for its work in boring holes and setting poles in any kind of soil that could be dug by hand methods without blasting. The boring-through-rock experiment was made by the Union Gas & Electric Company, Cincinnati, Ohio, in the erection of a high-power transmission line over a stretch of particularly hilly and rocky country.

In the work of digging the holes for the tower abutments, many different sizes of augers were used. First, the 48-inch auger was used to bring the working level of each corner to the same plane. Because of the hilly nature of the country, this work sometimes required considerable digging with the big auger. Next, a 24-inch hole was dug about 3 feet deep in the bottom of the 48-inch hole. This was filled with concrete after the corner post has been set. Below the 24-inch hole an 8-inch hole was dug 11 feet deep, at an angle of 9 degrees from the perpendicular.

In digging the 8-inch hole, a layer of rock varying in thickness from one foot to the depth of the hole was very frequently encountered. In handling this part of the job, the first operation in boring the 8-inch hole was to bore a 1½-inch hole through the rock to the required depth. A 1½-inch drill was attached to the auger-shaft and the hole drilled through the solid rock at the rate of about 1 foot in 10 minutes. In one instance where the rock extended the full length of the 11-foot hole, the hole was drilled in 2½ hours. Such a hole drilled by hand methods would have required three to four men three days. After the 1½-inch hole was dug, it was shot with dynamite and then cleaned out with the 8-inch auger. The cleaning-out process required but a few minutes.

The holes for the corner posts were drilled at an angle of 9 degrees from the perpendicular. It is necessary that the degree of the slant of the hole shall vary but slightly from the specifications. In order to insure this exactness, the boring machine is leveled by instruments, and the tower which carries the auger-shaft is tilted to the proper degree. At the dead-end towers an additional hole is drilled for the braces. This hole is also drilled from the bottom of the 24-inch hole. At the dead-end towers, however, the main holes are dug 4 degrees from the perpendicular, and the hole for the braces is dug at an angle of 31 degrees from the perpendicular.

Drilling through solid rock, although a new application, worked out very well.



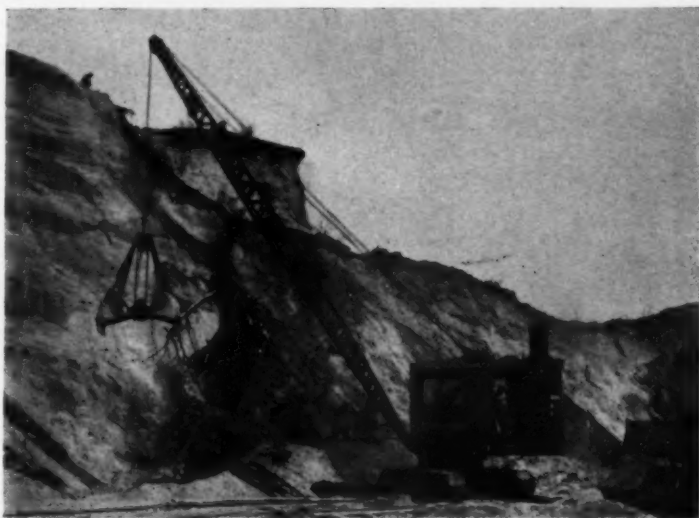
A 10-Ton Crane or a $\frac{3}{8}$ -Yard Shovel

Completely Convertible Unit Can Be Changed from Crane to Shovel in 60 Minutes

A NEW convertible hoisting mechanism which will perform the work of a 10-ton locomotive crane or a $\frac{3}{8}$ -yard power shovel, has been developed by the McMyler-Interstate Company, Cleveland, Ohio. The mechanism includes a powerful main engine, two independent power drums, a worm-driven boom hoist, and a separate swing engine. When used as a crane, this unit will operate a clam-shell bucket, dragline bucket, fall block, lifting magnet or orange-peel bucket. It can operate a pile-driving attachment with either a drop hammer or a steam hammer. When used as a $\frac{3}{8}$ -yard shovel, it is said to be powerful, fast and dependable. The main engine consists of two horizontal cylinders with 6-inch bore and 8-inch stroke. The boiler is 48 inches in diameter

plified remarkably for a convertible machine. When it is operating as a bucket crane, two levers control all digging operations. Since the hold drum is equipped with an automatic drag which prevents slack in the hold line, it is only necessary to use the steam clutch with which this drum is provided when it is desired to hoist the bucket open. The other lever controls the swing engine.

Power for traveling is delivered through a heavy vertical propelling shaft to the horizontal propelling shaft and then to the crawler driving sprockets. A single lever conveniently located near the operator actuates the clutches engaging the propelling mechanism. This convertible crane can be steered from the operator's platform very readily. Travel in any direction, regardless of the



CONVERTIBLE CRANE EQUIPPED WITH SHOVEL BOOM AND DIPPER STICK

and 7 feet 6 inches high. The worm-driven boom hoist permits rapid adjustment of the boom angle to meet operating conditions. In one hour or less the change from shovel to crane or from crane to shovel can be made on the job without special rigging or equipment. A steel cab with removable steel sash completely encloses and protects the operator and mechanism.

All of the mechanism on the turntable, including the main engine, swing engine, hoist drum and boom hoist are very accessible. Practically any shaft may be removed without disturbing any adjacent shaft. All bearings are readily replaceable and are of generous proportions to insure low bearing pressures. The arrangement of the mechanism on the turntable affords unusual convenience to the operator and fireman. All exposed gears and moving parts are protected by suitable guards. A standard system of forced feed lubrication is used throughout, making possible quick lubrication of every moving part.

The control system of this unit has been sim-

relative position of the boom and the running gear, is accomplished without previously connecting any steering links or chains. A steering wheel is arranged to turn freely about the rotating center of the crane between the turntable and the lower frame. To this steering wheel are connected the steering links which operate the jaw clutches of the crawler mechanism. A friction band, fixed to the turntable, encircles the steering wheel. In steering, the operator tightens this band around the steering wheel by means of the lever at his extreme right. Then by swinging the turntable, the steering wheel is turned, causing the steering links to disengage the desired jaw clutch on the crawler mechanism. In this manner full power is delivered to the crawler on one side, while the other side acts temporarily as a pivot.

The crane is equipped with a worm-driven boom hoist controlled by a lever within convenient reach of the operator. This boom hoist enables the operator to change the boom angle at will to meet varying operating conditions. The boom hoist is

driven through a worm and worm gear and is self-locking. An automatic brake is provided to hold the boom at any desired angle. The design is such that the boom can be raised or lowered under full load.

Gas-operated Cranes

The conditions under which the convertible crane operates determine to a large extent the type of power-plant. While steam is probably the best adapted for all-round crane and shovel work, the McMyler-Interstate Company has developed gasoline and electric machines to meet all possible operating conditions. The gasoline crane or shovel is powered with a heavy-duty 4-cylinder Climax engine which delivers 70 horse-power at 975 r.p.m.

The cylinders are $5\frac{1}{2}$ inches in diameter, the stroke 7 inches, and the piston displacement 665.2 cubic inches. The engine with its heavy cast base is mounted on the turntable in such a position that it is readily accessible on all sides. The design of the engine is such that adjustments and replacements can be made with the minimum of delay. All principal bearings are constantly flooded with oil under pressure, and provision is made for regulating the pressure in the system; a visible indicator shows the circulation of oil at all times.

A heavy-duty clutch connects the engine to the actuating mechanism of the crane. This clutch is controlled by a lever in the quadrant stand at the operator's platform. All gears are protected by guards.



McMYLER-INTERSTATE CONVERTIBLE CRANE EQUIPPED WITH CRANE BOOM AND CLAM-SHELL

Truck-mounted Cranes Handle Stone Work

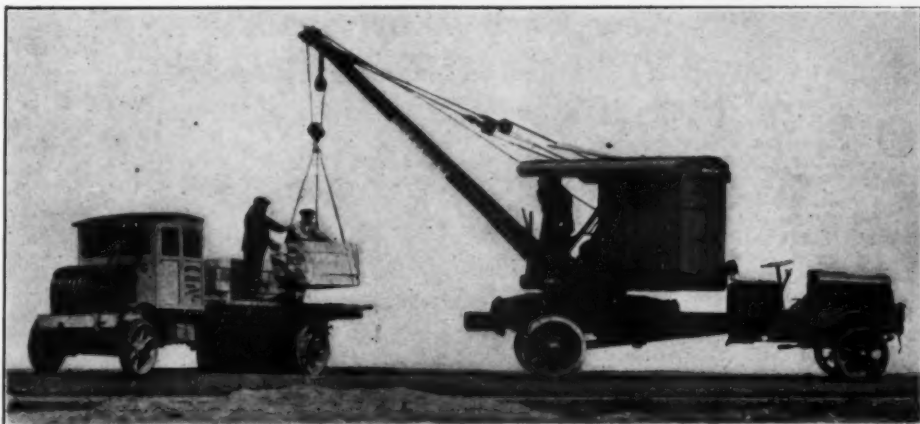
One Feature of Versatile Unit of Contractors' Equipment

THE Eureka Motor Service Company, Chicago, Ill., has been using a Universal truck-mounted crane for handling cut-stone work with a remarkable degree of satisfaction. The crane is equipped with a 20-foot boom and is mounted on an old 5-ton motor truck. The outfit was originally furnished with a three-part line, but the Eureka Motor Service Company wished to cut down the hoisting speed, so eliminated the line running from the upper snatchblock to the hoist block. Later the boomhead arrangement was changed and the crane was used with a four-part line for particularly heavy lifts.

This company handled the cut stone from railroad cars to trucks, hauled it to the job and unloaded it for the contractor, where it is ready to place with his derrick equipment. Formerly it was their practice to handle one piece of stone at

a time, but with the crane they now unload as many as twelve in one swing by using wire-rope slings. Twelve of these stones weigh a total of 9,600 pounds. A representative of the Eureka Company states that it is a daily occurrence to handle stones weighing 6, 7 and 8 tons and in one case they had to unload a giant stone planer that weighed considerably more.

While the Eureka Motor Service Company has never gone into the stone-placing work, other cranes equipped with 24-foot booms and 16-foot extensions have been used for this work, saving the cost of erecting derricks. One of these cranes was used to place a cornerstone after an 8-foot timber extension was added to the 40-foot boom, making a total length of 48 feet. The maximum weight of the cornerstones placed was 2,200 pounds each.



TRUCK-MOUNTED CRANE HANDLING STONE FROM TRUCK TO JOB (See text page 68)

A New Portable Gasoline-Engine-driven Air Compressor

Outfit Has Piston Displacement of 300 Cubic Feet of Free Air per Minute at 100 Pounds per Square Inch Pressure

A NEW portable direct-connected gasoline-driven air compressor, having a piston displacement of 300 cubic feet of free air per minute at a pressure of 100 pounds per square inch, has been announced by the Chicago Pneumatic Tool Company, 6 East 44th Street, New York City. The two compressor cylinders and the four engine cylinders are mounted on a single crank-case, which is divided by partitions into three compartments, so that engine, couplings and compressor are isolated. The crankshaft, of high carbon steel, is made in two sections, one of four throws for the engine, and the other of two throws for the compressor. The two sections are connected by a flanged coupling.

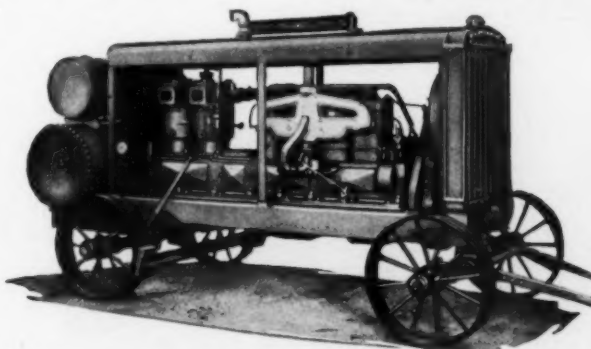
The compressor cylinders are cast separately and are equipped with Simplate flat disc valves. The bore is first rough-finished on boring mills and then ground to exact size on an improved type of

grinder, thus giving the bore a glass-like true surface, resulting in higher volumetric efficiency and longer life.

A geared pump supplies oil under pressure to the main bearings of the compressor and to constant-level troughs, from which it is splashed onto the connecting-rod bearings and, in the form of a mist, onto the cylinder walls.

The engine is of the heavy-duty 4-cycle, 4-cylinder type, provided with a heavy fly-wheel, a speed governor, high-tension magneto with impulse starter, pressure system of lubrication, and a hot-air stove. Relief cocks controlled by a single operating bar and placed near the upper end of the bore, serve to reduce compression, making the engine easier to start. The engine pump circulates cooling water for both the engine and the compressor through a cellular radiator, the sectionalized core of which is cooled by a fan, and is protected by bars.

The air supply is regulated by an unloader working in conjunction with the auto-pneumatic throttle. The latter slows down the engine when the compressor unloads, and causes it to speed up to normal just before the compressor again picks up its load. The frame or deck is a one-piece steel casting. Its rear end is shaped to form a recess for the air receiver and gasoline tank. The receiver is furnished with all necessary fittings, including a service valve at each end, and is connected to the compressor by an expansion joint. Each unit is enclosed and protected by a steel canopy top and sides which can be locked in place.



PORTABLE 300-CUBIC FOOT AIR COMPRESSOR

New Cast Alloy Steel

Tough Wearing Material for Cutting Edges and Surfaces

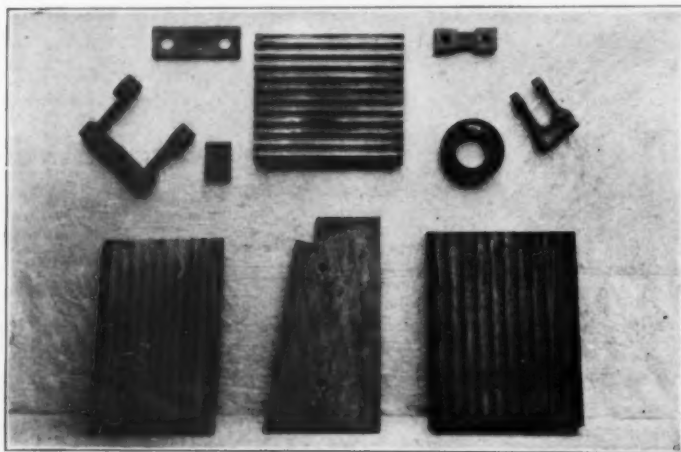
ONE of the interesting exhibits at the Chicago Road Show was that of the Gerlinger Electric Steel Casting Company, 60th and National Avenues, West Allis, Wis. This company makes a product known as "Gerlinger Hard-Wear," which is a steel, and consists of special composition of cast alloy steels, which are hardened and toughened to meet the requirements of extremely hard cutting edges or wearing surfaces, wherever maximum hardness and strength are demanded in mechanical design, as in crusher plates, grab bucket teeth and pulverizer hammers.

It is claimed that the wearing qualities of this new steel are superior to those of manganese steel. It is being used extensively at the present time on earth-moving machinery, such as plows, side-cutters, sprocket teeth and links, as well as steam shovels and crushers. When "Hard-Wear" plow points or scarifier teeth or similar parts have worn down, they do not have to be thrown away, but can be drawn out and

retreated and be as good as the original points or teeth.



GRAB BUCKET, STEEL SHOVEL, DREDGE DRAGLINE
AND BACK-FILLER TEETH



CRUSHER JAWS AND
CHEEK PLATE MADE
OF THIS NEW TOUGH
STEEL



LINKS MADE OF "HARD-WEAR" STEEL

Roller-Bearing Sheave Blocks for Slackline Cableway Excavators

Relatively Inconspicuous Feature Is Important for Economical Operation

A RELATIVELY inconspicuous feature of the Road Show exhibit of Sauerman Brothers, Inc., 464 South Clinton Street, Chicago, Ill., but one which attracted a great deal of attention, was the display of several sizes of new Sauerman roller-bearing sheave blocks, designed during the past year as an improvement on the blocks previously used at the mast-tops of Sauerman slack-line cableway excavators. These blocks are designed to operate 30 days without lubrication. The ability of these roller-bearing blocks to run smoothly for so long a time under continuous service without lubrication is due to the use of two Timken roller bearings of the cone type in each sheave, with case-hardened steel races running in a large chamber full of heavy cup grease. Should the steel casting meet with accident or become worn, the Timken bearings and races can be removed and placed in other castings. The bearings are protected with felt washers to keep out grit and dirt. The blocks as illustrated are equipped with the Alemite system of lubrication which is so rapidly becoming standard in the automotive industry and in many types of contracting equipment.



SHEAVE WHEEL AND TIMKEN BEARINGS FOR ROLLER-BEARING BLOCK



ROLLER-BEARING SINGLE BLOCK WITH SWIVEL EYE ATTACHMENT

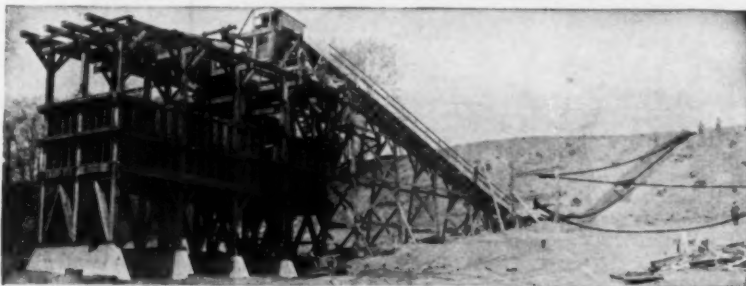
A Power Drag Scraper

Bottomless Unit Handling from $\frac{1}{4}$ to 5 Cubic Yards, Adaptable for Digging and Conveying Sand, Gravel and Clay

THE bottomless-type power drag scraper unit which is sold by L. P. Green, 1234 Monadnock Block, Chicago, Ill., is successfully used for digging and conveying sand, gravel, clay and other materials from the pit to a screening plant or brick plant or to a trap or hopper for loading wagons, trucks or cars. It is also adaptable for material-handling in and out of storage, as well as for stripping, excavating, grading, backfilling, levee work and clearing out reservoirs. It is claimed that

it digs from under water as well as in a dry bank.

Although occasionally an extra laborer or two are necessary to set up the outfit, one man and an assembly of standard contracting equipment, such as hoist, scraper, wire rope, blocks and a few fittings, will handle an average gravel-pit or loading job. The Green bottomless scraper is built in sizes from $\frac{1}{4}$ -cubic yard to 5 cubic yards or larger, and is built for use with either steam, electric,



SAND AND GRAVEL PLANT WITH GREEN POWER DRAG SCRAPER

gasoline or oil power. The scraper is of substantial construction, reinforced where necessary to stand the strain which it must meet under hard conditions, and must still be light in weight, so that the scraper weighs only about one-quarter of the load it will carry. All the wearing parts are replaceable and it is built so that there are no sharp angles to retain the material.

The digging portion of the scraper unit is built with a proper angle to insure a full load, and with a cover plate over the top to make a positive stop against overloading, giving assurance of a uniform load with each trip in any kind of material. The cover plate can be raised or lowered to change the capacity, and can load light on an up-grade haul or heavy on down-grade.



COMING IN WITH A FULL
LOAD

Power Diaphragm Pumping Outfits

Contractors' Pumps of High Capacity and Other Features

IN the last six months the Humphries Manufacturing Company, Mansfield, Ohio, has developed a line of high-capacity diaphragm pumps consisting of single and double 3-inch and 4-inch units, which were displayed at the Chicago Road Show. The 4-inch unit is capable of pumping 12,000 gallons per hour at a 5-foot lift, and the 3-inch unit during recent tests is reported to have discharged 7,500 gallons per hour at a 5-foot lift. These units are powered with Hercules, Fuller & Johnson or Le Roi engines.

The outfits are adapted particularly to the pumping-out of excavations, trenches, ditches, sewers, coffer-dams, boats and barges. In sandy ground a very effective drainage combination may

be created by connecting this pump with a number of well points driven into the ground to be drained. Experience has shown that up to 10 per cent of the volume pumped may be solids without materially reducing the discharge. Very little priming is necessary. The rocker arm as illustrated is so constructed that the diaphragm is raised and lowered in almost a straight line, preventing any twisting of the diaphragm which would cause it to wear quickly.

All parts of the pump are easily accessible. With an ordinary wrench the discharge valve can be entirely removed for cleaning purposes in a very short time. The surfaces of the spout casting and base which hold the diaphragm are machined to insure a snug fit and prevent rattling.



A POWER DIAPHRAGM PUMP WITH A CAPACITY OF 7,000 GALLONS
PER HOUR AT 15-FOOT LIFT

The top of the pump is so curved as to govern the current of water, thus preventing splashing. The suction valve is pure rubber, and is of the flap non-clogging type.

The position of the suction inlet in relation to

the cranking side of the engine is an important matter in the field. On these units they are on opposite sides, so that the operator need not stand near the excavation when cranking the engine. This eliminates an industrial hazard.

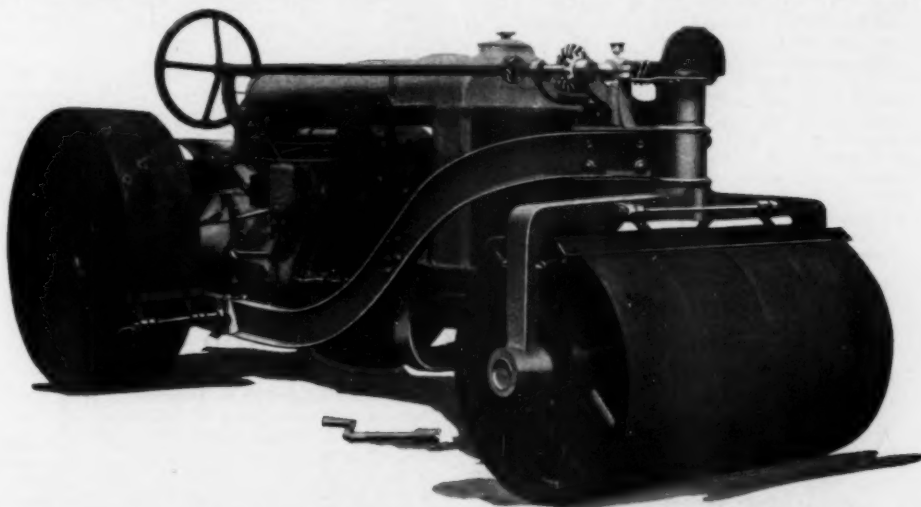
A Compact 3- to 4-Ton Road Roller

Equipment Makes Use of Fordson Tractor as Motive Power

THE exhibit of Horst & Strieter Company, Davenport, Iowa, at the Chicago Road Show, featured the Winchell 3- to 4-ton road roller. This roller makes use of the Fordson tractor and is one of the latest developments in 3- to 4-ton rollers suitable for road work, city streets and alleys, public parks and golf links. The roller is so designed that by removing the front wheels of the Fordson it can be attached to the tractor in an hour's time, as only three pins and three bolts are used in making the change, and it is equally easy to remove the roller and put the tractor back in its original form.

tached at the rear to the draw-bar of the Fordson and at the front carries the steering mechanism and front support. The front roller has four rolls instead of the customary two, thus giving better differential action, making for easier steering and manipulation.

Inasmuch as the crank-shaft of the Fordson tractor is located behind the front roll, a cranking device has been inserted, making it possible to crank the tractor from the side. The supporting yoke for the front of the tractor passes beneath the crank-shaft. The yoke is made of annealed cast steel. The frame from which the yoke hangs



THE WINCHELL-FORDSON ROAD ROLLER, SHOWING CRANK IMMEDIATELY BELOW CRANK-SHAFT, WHICH IS EXTENDED TO THE SIDE TO FACILITATE STARTING

The equipment includes the regular Fordson rear wheels, from which the cleats have been removed, and the wheels themselves have been filled with concrete to give the necessary weight. The cast iron wheels for the rear are optional at additional cost.

Before the rear wheels are filled with concrete, means are provided at each rivet hole for inserting sod pins, which are used when the roller is operating on slippery highways or on rolling park or golf course sod. The Winchell roller consists essentially of a curved steel frame which is at-

is double-strength 5-inch channel steel.

The steering mechanism is the regular Ford truck differential worm and worm gear. The roller operates at 1.48 and 2.73 miles per hour forward and 2.61 miles per hour in reverse. The scrapers on the rear wheels are adjustable and can be moved forward on the frame to give clearance when the sod pins are attached to the rear wheels. To adjust them it is necessary to loosen only two bolts, slide the scraper forward on the frame and tighten the bolts again, the outfit then being ready for immediate service.

When considering the purchase of new equipment look over the "Where to Purchase" Section on pages 3 to 49 and the catalog listings on pages 63-64.

A 7-Ton Worm-Gear Drive Gasoline Locomotive

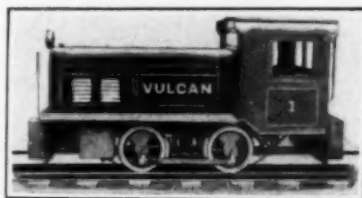
New Unit in Service Has Proved Its Value

A HIGH-POWERED gasoline locomotive of the 7-ton size, Class I.G.S., known as the "7-ton Special," has recently been designed and placed on the market by the Vulcan Iron Works, Wilkes-Barre, Pa. This locomotive is of the worm-gear drive type. The worm drive and reversing mechanism is mounted as a unit in a cast steel oil-tight, dust-proof housing, made in halves, placed in the center of the rear axle, permitting quick and easy assembling and dissembling without the necessity of removing the axle from under the locomotive.

The transmission is of the 4-speed selective gear type, the gears being of the constant mesh jaw type, wherein the gears are always in mesh, and speed changes are made through jaw clutches and not through the clashing of gears. This eliminates all chance of gear stripping and makes possible easier and quicker speed changes without loss of acceleration or momentum to the locomotive and load. The transmission case is entirely enclosed and protected from dust and grit by proper packings and covers.

This locomotive is said to have sufficient power to slip its wheels in first and second speeds, and the draw-bar pull at these speeds depends upon the condition of the track and rolling stock. The rated draw-bar pull under normal conditions at each speed is as follows: 2 miles per hour, 4,200 pounds; $4\frac{1}{4}$ miles per hour, 3,500 pounds; $7\frac{1}{4}$ miles per hour, 2,500 pounds; $10\frac{1}{8}$ miles per hour, 1,725 pounds.

The frame of this unit is similar to the Vulcan steam locomotive, being made of open hearth cast



A 7-TON GASOLINE LOCOMOTIVE
WITH WORM-GEAR DRIVE

steel, locomotive bar type. The bumpers are of heavy section cast iron with separate coupler pocket castings. The axles are of high-grade forged steel, the wheel bearings of cast iron, bronze-lined with removable collars, and the springs of the heavy coil type. The wheels are connected by forged steel side rods, as in steam locomotive practice.

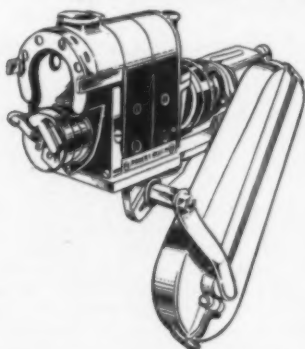
The steel cab is fully enclosed, with sliding doors at the rear and clear-vision windows all around. The operator sits in the cab facing forward, with all levers, pedals, switches and buttons conveniently located for easy manipulation.

This 7-ton special is equipped with a Waukesha model D. U. bus motor, developing 60 horse-power at 1,400 r.p.m. with Splitdorf magneto and Westinghouse self-starter and electric lights, Stromberg carburetor, Willard storage battery and tubular radiator well protected.

New Reliable Magneto for Fordson Tractors

Increased Power, Easier Starting and Fuel Economy Claimed

A HIGH-TENSION magneto Type ZU-4 for Fordson tractors has been placed on the market by the Robert Bosch Magneto Com-



MAGNETO FOR FORDSONS, SHOW-
ING ALUMINUM HOUSING FOR
DRIVE CHAIN

pany, Inc., 123 West 64th Street, New York City. This same instrument is used by many thousands of tractor and truck owners on larger equipment. It is entirely dust- and water-proof. The impulse starter coupling makes it easier to start the tractor, and the flexible-drive feature allows the coupling to withstand the most severe conditions. When the engine increases speed, the impulse mechanism is automatically disengaged.

The drive for the magneto is of the chain type. The chain does not need to be taken apart for mounting, and no extreme accuracy is required when lining up the magneto; thus the installation is greatly simplified. The chain is protected from water and dust by an aluminum housing.

If desired, the Bosch governor can be furnished with this magneto attachment at a slight additional cost. This device is built into the magneto interrupter and prevents the engine from racing when the load is suddenly removed. When using the Fordson for belt work, such as sawing or driving a crusher, the governor is particularly useful because it makes it unnecessary for some one to continually open and close the gas throttle,

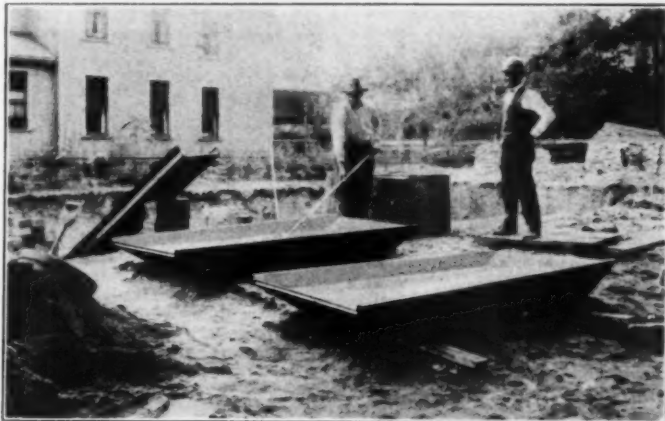
Steel Mixing Boxes

Many Advantages in New Type Over Clumsy Wooden Mixing Boxes

A STEEL mixing box which has many advantages over the old clumsy wooden mixing boxes has been developed by the Heltzel Steel Form & Iron Company, Warren, Ohio. By the use of this box no more splinters or nails will get into the water, there will not be the loss through knotholes and cracks, and the boxes cannot split. The top edges of these boxes are reinforced with double steel flanges, not only affording a rigid construction all around, but providing permanent holds for easy handling, for which only two

men are required. The boxes are riveted together, but there is not a single rivet on the inside to catch the mixing tool.

The bottom of these steel boxes is in one piece, smooth, seamless, and leaving no place for mortar to stick and harden. It is easy to mount these boxes on a few bricks and place a fire underneath, thus making it possible to continue work in freezing weather. Another advantage is that these boxes can be used in the interior of buildings without any chance of damage through leaks.



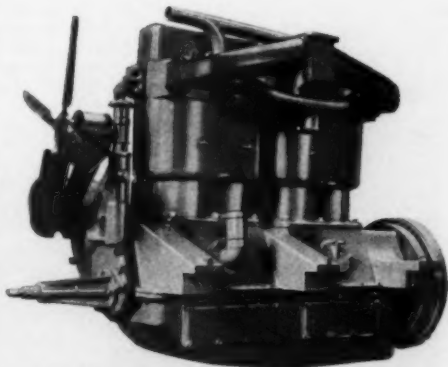
STEEL MORTAR
MIXING BOXES
IN SERVICE

Four- and Six-Cylinder Industrial Motors

New Units for Gasoline Shovels, Cranes, Draglines and Locomotives

THE increasing use of gasoline power and the dependability of these units in the contracting field in the last few years have been remarkable. The Beaver Manufacturing Company, 35 25th Street, Milwaukee, Wis., has developed new 4- and 6-cylinder engines suitable for gasoline shovels, cranes, draglines and locomotives, as well as power units for use in mills.

The engine is of the valve-in-head type with removable cylinder heads and produces from 70 to 130 horse-power. All the moving parts are enclosed in a dust-proof frame and are lubricated by means of force feed through a drilled crank-shaft. The piston and piston-pins are lubricated from the splash. Dual ignition is provided for, so that two spark plugs may be used in each cylinder. There is also provision for standard electrical equipment, generator and starter. The outstanding feature of this engine, according to the manufacturers, is the manifold, to which particular attention has been paid, resulting in a decided advance in power and economy. The motor is entirely free from exposed piping and mechanism, yet all parts are accessible for inspection and minor adjustments. The engine has advantageous power characteristics with high torque at low speed, with a practically straight line torque at all operating speeds, but with the highest torque below the ordinary operating speed.



FOUR-CYLINDER VALVE-IN-HEAD TYPE INDUSTRIAL MOTOR

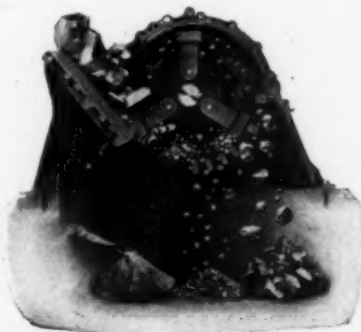
A Hammer Rock Crusher

Two-Man Rock Reduced to 1½-Inch Size in One Operation

AN adjustable rotary rock crusher in which a series of hammers reduce one- and two-man rocks to any desired smaller size in one operation, is made by the Williams Patent Crusher and Pulverizer Company, 2701-2723 North Broadway, St. Louis, Mo.

In this crusher the rock is unloaded from the truck or by the shovel onto the sloping face, down which it slides to be struck a sturdy blow by one of the several hammers rotating within the casing. The crusher or pulverizer has three adjustments which determine the size of the finished material. The patented front end, which is pivoted at the top, can be moved toward or away from the hammers. The cage can be made up of grates of larger or smaller openings to hold the oversize rock until of proper size to pass through the openings, and the spacing of the hammers can be varied and rearranged to give the results desired. For example, to make macadam, the front end is lowered, and a 2½- or 3-inch grate is used; all pulverizing action is avoided and the rock escapes through the openings as quickly as it becomes of the proper size. Macadam and concrete stone made with this crusher is approximately cubical in shape with a minimum of slivers to bridge and form air pockets in concrete, and it is claimed also that it has an unusually small percentage of undersize material.

The manufacturer states that the large crushing ratio of these outfits makes it possible for them to do the work of two or three crushers of any other type. It is possible to crush 36- and even



PHANTOM VIEW OF CRUSHER AND PULVERIZER

48-inch cube limestone to 1½ inches in one reduction with the Mammoth type, while 20-inch and 16-inch rock is crushed to 1½-, 1-inch or even smaller by the Jumbo and Jumbo Junior.

A number of remarkable records are reported by some of the users. John Herzog & Son, Forest, Ohio, report that one of the Mammoth crushers reduced 30-inch cube stone to 1½-inch for macadam, saving them \$20,000 in first cost and \$4,300 yearly, cutting the crushing cost 53 per cent.

A Portable Concrete Surfacers

New Machine Removes High Spots on Concrete Roads or Makes Channels in Floors

NO matter how much care is used in the construction of concrete roads, it is sometimes almost impossible to avoid some high spots, especially on grades and banked curves where the concrete tends to creep. The Ingersoll-Rand portable concrete surfacer, recently placed on the market by the Ingersoll-Rand Company, 11 Broadway, New York City, which was exhibited at the Chicago Road Show, removes such high spots quickly and

at about one-tenth the cost of hand labor.

The outfit consists of a special mounting for a "Jackhammer" drill consisting of two wheels and a convenient handle. The capacity of the machine can be estimated from a trial recently made on Route No. 11 of the Illinois State Highway. There, an operator who had never used the machine before, resurfaced 30 square feet of high spots in two hours. The high spot was 1¾ inches at the center and tapered down to a feather-edge at about 2½ feet on each side of the joint.

In building-work, this surfacer may be conveniently used for roughing the film or scale which form on the top of a concrete base, when it is desired to prepare it for the finishing cement top coat or layer. This device may be also used for making cable ducts in concrete floors. The surfacer first cuts a trench to the required depth; next, a thick elastic rubber tube is laid in the trench. This tube constitutes the duct, the concrete being poured over it. After the concrete sets, the tube is pulled out from one end. This Murray conduit system for street conduits is described on page 77.



REMOVING HIGH SPOTS ALONG EXPANSION JOINT OF PAVEMENT

A Monolithic Concrete Duct

New Form of Construction Now Being Installed by Prominent Contractors

DURING the past year widespread interest has been aroused among engineers, public utility operators and contractors interested in the construction of electrical conduits, by a comparatively recent development in conduit construction which has been introduced to the trade under the name of the Murray Conduit. It is a monolithic conduit system, the product of several years of exhaustive experimentation and development on the part of its inventor, Thomas E. Murray, Murray Conduit Systems, 55 Duane Street, New York City. The first practical installation of this system was begun in October, 1923. It consisted of an underground trunk line of thirty-two 4-inch conduits erected on Pleasant Avenue (107th to 115th Street), New York City, by the Consolidated Telegraph & Electrical Subway Company.

A short time later work was begun on the first interior installation of Murray Conduit. This consisted of 274,000 feet of wireways, ranging in diameter from $\frac{3}{4}$ -inch to 4 inches, installed in the New York Edison Company Service Building, a reinforced concrete structure located at 41st Street and First Avenue, New York City.

From the date of the beginning of the first installation mentioned above to February 1, 1925, a total of 2,897,400 feet of Murray conduit had been completed. This article will be a description of its use for the purposes of underground construction.

General Outline of System

The method of installing Murray ducts is most unique in engineering construction. The conduit is actually constructed, in situ, in the trench. The basis of the system is the employment of a heavy-walled tubular rubber form of special composition, which serves as a mold or core. The tubular form is placed in position wherever the conduit or wire-way is desired, and is then encased in the conduit. When the concrete has set, the rubber form is withdrawn, leaving a smooth, round hole in the concrete, which serves as the conduit. The same rubber forms are used over and over again for an indefinite period.

Details of Construction

In actual practice, a bank of as many as twelve conduits is built at one time by means of a special spacing apparatus such as is represented in Fig. 1. The reader will observe in the lower right-hand corner of the sketch a recently constructed section of conduit bank (A). The tubular rubber forms (E) still remain in this section of the bank, and their free ends, projecting therefrom, pass through corresponding metal tubes in the spacing machine and extend on into the open trench ahead. It will be observed that those sections of the rubber forms (E) which are exposed between the bulk-

head (C) of the spacing apparatus and the end of the duct bank (A) are in perfect alinement and that the spacing between them is absolutely uniform. This alinement of the rubber forms during the construction of the conduit bank is the chief function of the spacing device.

To continue the construction of the bank from the point indicated in the sketch, concrete (D) mixed to the proper consistency is now shoveled into the receiving pan (G) of the apparatus and thence into the working receptacle formed by the end of the previously constructed bank (A) and the side aprons (B) and bulkhead (C) of the spacing machine. The concrete mixture used in constructing this system of conduits should be of such a con-

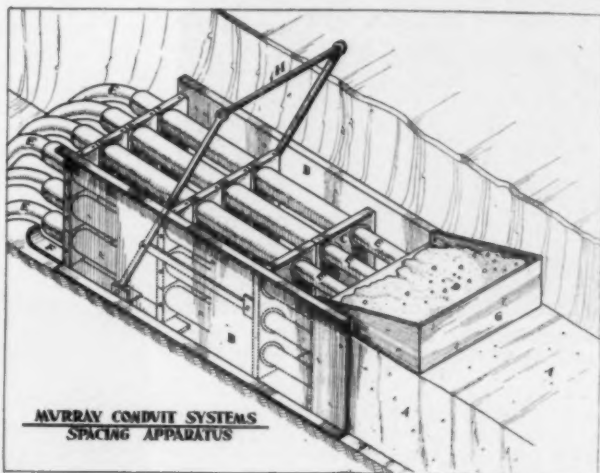


DIAGRAM OF OPERATION OF SPACING APPARATUS

sistency that only a slight amount of water can be squeezed out of the mixture with the hand. The concrete is tamped in place from above as it is poured into the receptacle, and likewise from the end by operating the handle (H) which actuates the movable bulkhead (C).

When the receptacle has been completely filled and thoroughly tamped, the handle is pushed down (towards the bulkhead) to the end of its stroke. This operation compresses the freshly poured and tamped concrete to the proper density and at the same time causes the entire spacing apparatus to be propelled forward for a distance of about 8 inches along the bottom of the trench on the skis or runners (F) on which it rides. The handle is then raised again to the position shown in the sketch, thus pulling the bulkhead away from the concrete for a distance of 8 inches and thereby providing a new working receptacle; whereupon the operations described above are repeated. Thus, it is observed, the entire bank of conduits is built at one time in increments of about 8 linear inches.

To withdraw the rubber molds from the concrete, a wooden mandrel or plug about one foot in length is placed in the free end of the rubber tube which is to be withdrawn, so as to prevent



CONSTRUCTION OF BOTTOM SECTION OF EIGHT CONDUITS, BY EDWARDS AND FLOOD, BROOKLYN, N. Y.

it from collapsing under strain. A universal cable grip is then placed over the end of the tube and a rope or steel cable attached to the grip. When a strain is put on the rope, the tubular form begins to elongate and consequently to contract in diameter. This contraction of the tubing causes the immediate rupture of any slight bond that may have formed between the tubing and the concrete and permits the form to be readily withdrawn.

Installation Costs

Under average conditions, three workmen are required to operate the spacing apparatus in installing a bank of Murray conduit. One man operates the handle, another does the tamping, and the third feeds the concrete into the working receptacle. In addition to these men, one man will be required to operate the mixer, while the number required to feed the mixer and to carry the concrete from the mixer to the spacing machine will obviously vary with local conditions.

In a clear trench a crew of six men will install a ten-duct bank of Murray conduit at the rate of 25 trench feet (250 linear duct feet) per hour. This includes the complete construction of the conduit bank, exclusive only of the excavating and back-filling operations.

In this connection it should be observed in Figure 1 that a feature of the spacing apparatus is that it carries its own side aprons. No other aprons or wall forms are required, therefore, thus eliminating

a costly operation in the construction of conduit banks.

Another distinctive characteristic of the Murray system is that it requires a specific minimum amount of concrete, which can be easily calculated and with extraordinary accuracy. For example, in the case of the duct bank illustrated in Figure 1, there are twelve 4-inch conduits (four wide and three high), having a 2-inch spacing in both horizontal and vertical directions. The entire bank is surrounded by a 3-inch envelope of concrete. A cross-section of the bank at any point, therefore, is 28 inches wide by 22 inches high, and contains twelve 4-inch diameter round holes. The surface area of the concrete in the cross-section would therefore be 465 square inches. This latter figure, multiplied by the length of the duct bank, gives the volume of concrete required to build the bank. The design of the spacing device is such that the dimensions of the bank will correspond precisely with the theoretical value.

Material Requirements

The standard proportions of the cement, sand and stone for concrete for the construction of Murray ducts is 1:3:5 (i. e., one part of cement, three of sand and five of stone).

To insure maximum fire protection, the spacing between the ducts is normally 2 inches in both horizontal and vertical directions, and the entire conduit bank has a 3-inch concrete envelope. Both the thickness of the envelope and the spacing between



SECTION WHERE IT WAS NECESSARY TO SPREAD THE CONSTRUCTION OUT INTO A BANK TWO CONDUITS HIGH AND TEN WIDE

This method was necessary in order to carry the bank over the roof of the subway and still maintain the necessary cover

the conduits are frequently altered, however, to meet special requirements.

Among the more prominent organizations that are employing the Murray conduit system for a part or all of their conduit requirements might be mentioned the following: New York Edison Company, Consolidated Telegraph & Electrical Subway Company, Bronx Gas & Electric Company, New York & Queens Electric Light & Power Company, Westchester Lighting Company, Yonkers Electric Light & Power Company, Brooklyn-Manhattan Transit Corporation, General Electric Company, New York Central Railroad Company, Philadelphia Electric Company, Detroit Edison Company.

A 40,000-foot installation of Murray conduit was recently constructed by Edwards & Flood, Inc., Brooklyn, N. Y., for the Brooklyn-Manhattan Transit Corporation. The installation is located on Avenue T, Brooklyn, N. Y. It is an eighteen-duct bank consisting of four tiers of four ducts each and an additional top tier of two ducts. Another recently completed installation of importance is a four-duct bank of 3-inch diameter conduits constructed by The William F. Kenny Company, New York City, for the New York City Fire Department. The installation is located on Franklin Street, Brooklyn, N. Y., and is the initial installation of Murray conduit for the Fire Department in New York City.



THE TOP OF THE COMPLETED BANK AT A POINT WHERE IT WAS NECESSARY TO SWING AROUND A MANHOLE

A New Type of Traction Drive for Power Shovels

Improvement on Original War-Tank Tread Is of Interest

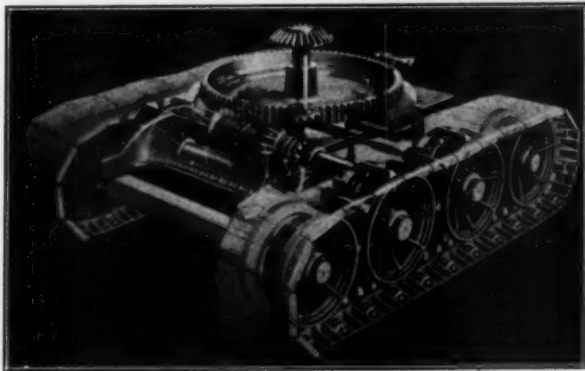
A FEW years ago when continuous-tread trucks were adopted for power-shovel mounting, they proved so much more satisfactory in every way than traction-wheel mountings that they were welcomed by contractors and demanded by most shovel buyers. Their superiority over traction-wheel treads probably accounts for the fact that shovel users were very tolerant of the weaknesses which naturally resulted from hastily accepted designs. All shovel companies realized that they must build continuous treads and they must get them on the market quickly. This resulted in the release of designs before all the essential factors were considered. The Thew Shovel Company,

Lorain, Ohio, which has just brought out a new center-drive traction-tread truck, admits that its original design was no exception.

About three years ago the Thew Shovel Company began to give more serious consideration to the peculiar strains and conditions of power-shovel operation and the design of a continuous tread to meet these conditions. In the spring of 1924 the first truck of the new design was finished. It was then put to every conceivable test, many of them far more vicious than any truck could ever be called upon to stand. The need of a few minor improvements was naturally discovered during these months of test, but the vital principle of design has

shown this truck to be a success for shovels. The outstanding feature of the new truck is the driving principle. It is really a traction-wheel truck with cleats, which lays its own smooth track to travel on with four wheels directly driven by spur gears.

Heretofore, all continuous treads have been driven by two sprockets at one end, and the treads must be pulled around the other end by spur gears. This naturally created considerable wear and friction. The new Thew truck drives from a shaft in the exact center. This shaft, instead of driving two end sprockets, drives four large-diameter wheels, two on each side. These wheels run on stationary shafts and are driven by spur gears on each end of the center drive shaft. The weight of the shovel is thus distributed equally



PHANTOM VIEW OF CENTER DRIVE STEAM SHOVEL TRUCK

on both sides of the shaft. The four drive wheels have gear-like teeth which mesh with teeth on the treads. These teeth are required for driving only when on a grade or in deep mud. The teeth, however, serve another very important function. When on top of the wheels, they carry the treads forward and lay them down before the outer idler rollers as smoothly as is done by hand, instead of pulling them around under tension. There is, therefore, no strain upon the tread pins or upon the treads as they roll over the end. This eliminates the greatest cause for wear and friction on tread

pins and makes lubrication of pins absolutely unnecessary. No weight rests upon the gliding mechanism. Thus it is relieved of all strains, except the transmission of driving power.

A test was made of a Thew O $\frac{3}{4}$ -yard shovel mounted on this new truck. It was found that it could be easily towed at a rate of 5 miles per hour, by an empty $3\frac{1}{2}$ -ton motor truck without damage to an asphalt pavement over which it was towed.

The shovel could climb a 30 per cent grade and stop and start on the same grade without any difficulty.

A Heavy-Duty No. 21-E Paver

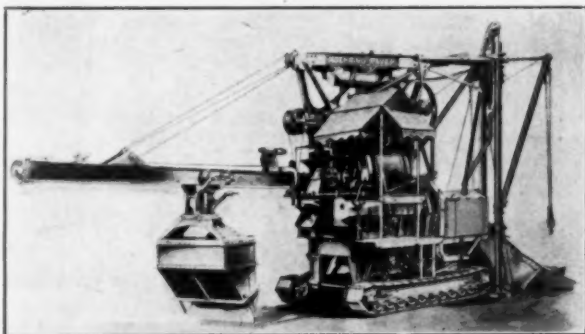
Machine Built to Operate Simply and Economically and to Stand the Test of Continuous Operation

THE heavy-duty 21-E paver made by the Koehring Company, Milwaukee, Wis., and exhibited at the Road Show, has been constructed in all its parts, according to the manufacturers, to make a concrete paver that will operate simply and economically and will stand the test of continuous operation.

The charging skip is of the pivoted type with the cables exerting perpendicular pull on the skip. This method of skip control eliminates to a very large extent the stress ordinarily imposed on the paver frame. Ordinary skip control transfers the load to the frame, causing disalignments and crystallizations. The water discharge pipe is of special design, being curved and pointed inward and downward as it enters the drum. The pipe opening is flattened at the end to give the water a fan-like spray as it is discharged, thus distributing the water better and effecting a more thorough mix. A trip-arm that is automatically opened when the skip rises effects the discharge of the water into the drum at the same time for each batch, insuring uniformity.

The multiplane traction on the 21-E paver has bronze-bushed rollers and is mounted as one unit. The roller shafts are drilled lengthwise with a small hole leading to an outlet to the bearing surface, allowing the pressure lubricating gun to force lubrication to the bearings. The pins are easily removable between the shoes, simplifying repair. Individual shoes are held by links across the entire width. The multiplane is long and wide, securing a low ground pressure per square inch, insuring that it will not injure the subgrade in any way whatever. Three-point suspension of the axle minimizes the frame disalignment by providing an equalizing fifth wheel oscillation which absorbs the shocks and end thrusts when the paver is operating on grades or irregular pavements. An Alemite duplex lubricating system with high-pressure grease gun and grease cups keeps the multiplane bearings from wear because of improper lubrication.

Double-gear drum drive provides ample power as well as an even, uniform application of power. The drum rollers are covered with castings to shield them from spilled concrete or foreign objects which might lodge in the teeth and cause breakage. The



THE HEAVY-DUTY 21-E PAVER WITH MANY INTERESTING FEATURES

frames are braced and gusseted at all stress points by clip angles and plates.

The discharge and placing of concrete from the Koehring 21-E paver is particularly fast, because of the automatic distributing boom and the self-spreading bucket, which spreads the concrete in a ribbon on the subgrade.

This machine has all the earlier Koehring heavy-duty construction features, including beveled-edge drum rollers which are fixed to the shaft, which in turn revolves on bearings on the main frame, multiple disc type skip clutch, either gasoline, steam or electric power, and power discharge operated by a double cone clutch.

Rosing Now with Armco Culvert & Flume Manufacturers Association

THE Armco Culvert & Flume Manufacturers Association, Middletown, Ohio, has announced that Anton S. Rosing, formerly Assistant Manager of the Advertising and Publications Bureau of the Portland Cement Association, 111 West Washington Street, Chicago, Ill., has been appointed Publicity Manager of the Armco Culvert and Flume Manufacturers Association, Middletown, Ohio, in charge of advertising, publications and other publicity work. Mr. Rosing is a civil engineer, a graduate of the University of Michigan, and a member of the Western Society of Engineers.



Keeping All Roads Good

Throughout the country, progressive counties, townships and state highway departments are organizing "Caterpillar" patrol systems for maintaining definite units of dirt and gravel roads; to keep all roads good—not just the main highways.

Wide-awake officials see the basic economy of increasing the mileage of usable secondary roads; to make neighboring communities more accessible; to establish through routes for heavy traffic; keeping the roads in first class condition—in dry weather and in spite of rains and heavy snows.

The "Caterpillar" by its strength and endurance has been the principal means of making such programs workable. Small communities find one or two "Caterpillars" effective; larger programs utilize great fleets.

There's a size of "Caterpillar" for every need, suitable for any program. The 2-Ton is ideal

for patrol duty, and handling lighter maintenance equipment. The New 5-Ton, with its proved outstanding abilities, is in a class by itself for all medium power demands. The great 10-Ton is supreme for heavy duty. Each size is designed and built to deliver the most miles of useful uninterrupted work, at the lowest possible cost; to make a road budget go as far as possible.

The "Caterpillar" compels the attention of every public official, road maker, engineer and contractor because of the universal success of the thousands of "Caterpillars" engaged in this and other important lines of work. Before purchasing any additional equipment, a thorough investigation of the latest "Caterpillar" should be made by all means. We invite your inquiry and are prepared to furnish the most definite and convincing figures and cost records of "Caterpillar" economy in operation and in upkeep.

There is but one "Caterpillar"—Holt builds it.

The Nation's Road Maker

THE HOLT MANUFACTURING COMPANY, INC.
PEORIA, ILLINOIS **STOCKTON, CALIF.**

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A New 5-Ton Tractor

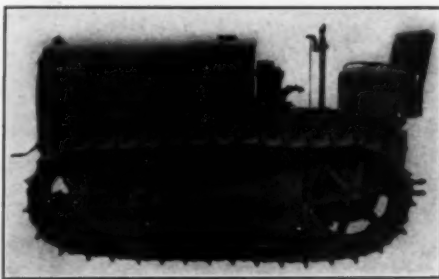
Model Designed Specially to Meet Exacting Demands of Medium Power Field

A NEW 5-ton Caterpillar tractor has recently been announced by the Holt Manufacturing Company, Peoria, Ill. The new model, which was displayed at the Road Show, embodies many new and distinct features tending toward greater accessibility, dependability and economy. The outstanding feature of the new design is unit construction. Three units—the engine, transmission, and trucks with track—form the complete tractor.

The motor is a 4-cylinder, valve-in-head type with a 4¼-inch bore and a 6-inch stroke, operating at 1,000 r.p.m. It has a gear-driven fan and water pump and full force feed lubrication. Large side plates provide for bearing inspection and adjustment.

The transmission is the selective gear type with three speeds forward and one reverse. The forward speeds are 1.75, 3 and 4.25 miles per hour, and the reverse 2 miles per hour. In each speed, power is applied to the sprocket with but three gear contacts. All shafts are mounted on heavy-duty ball and roller bearings. Steering clutches provide independent, yet positive, drive to each track. No differential is employed.

The entire weight of the tractor is carried on the roller frame through 3-point spring-mounted suspension. The truck frame incorporates marked simplicity in design, yet permits operation of each side to accommodate itself to the inequality of ground surface. A new and unique feature is the drive link and spring construction, which permit the centers of the drive sprocket and track



A NEW 5-TON "CATERPILLAR" TRACTOR

idler to approach each other so that the drive sprocket can slip over the space blocks, should an obstruction gain access to the track unit. The track shoes and rails are cast integral of high-carbon steel, specially heat-treated. The track shoes are 12 inches wide.

While this new model, which has been designed particularly for use in the medium power field, is rated at 30 draw-bar horse-power, the manufacturers claim it has a substantial reserve for all conditions. Its size makes it suited for township, municipal and special road districts, having flexibility, speed and economy for maintenance and patrol operations, as well as for contracting work.

Improvements in 1925 Paver

New Paver Has Increased Drum Capacity

A NUMBER of important improvements in the 1925 model Multi-Foote paver made by The Foote Company, Inc., Nunda, N. Y., were noted in its exhibit at the Chicago Road Show.

The mixer drum has increased capacity with larger charging and discharging openings. There is a 5-inch vertical drop between the charging opening and the drum shell and a 7-inch vertical drop between the discharge opening and the drum shell, and the wearing rings are flanged inward at the opening to deflect material toward the center of the drum and prevent slopping.

The drum is located 10 inches nearer the center of the machine. The drum tracks are machined. The discharge chute, which is of all-steel construction, has a steeper pitch and larger clearance. The power discharge has been improved and simplified, being of the planetary and eccentric type with cut steel gears all enclosed. It locks automatically in either discharging or non-discharging positions.

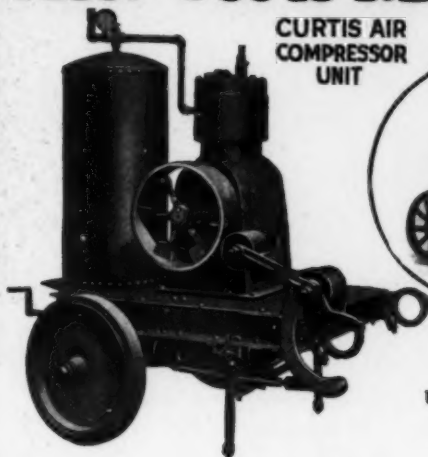
The tread shoes of the traction have been improved by increasing the size of the tread pin from ¾-inch to 1½ inches in diameter, thus preventing bending or breaking of the pins and stretching of the tread. The tread shoes have been provided with an opening in the face of the shoes under the sprocket tooth to prevent pocketing of

material, and treads climbing on the sprocket teeth as a result. Band brakes for the steering clutches, with double the friction surface and automobile type of adjustment, replace the shoe type of brake. The traction drive is arranged so that no traction parts are running except when moving the machine. The tread adjustment has also been improved.

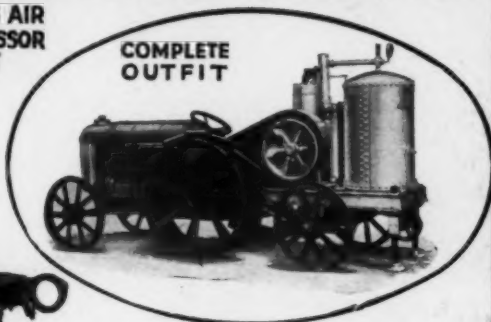
The location of the hoist has been changed so that it is more easily accessible. The hoist bearings are mounted between the channels instead of on high bearings on top of the I-beams, thus greatly increasing the rigidity of the frame. The babbit thrust screw-nut has been replaced by a renewable bronze nut. The left-hand thrust nut has been replaced by a split ring with positive lock which it is impossible to loosen. The cable drum has been changed so as to make cable attachment easy.

The loading skip on the new model is centered on the machine, so that a standard 92-inch-wide loading skip will operate in an 8-foot road between forms. Ease of lift of the skip is increased by a change in the location of the bearings, and greater rigidity is secured by a wider spread of the bearings. An increase in the width of the sub-hopper and throat of the loading skip accelerates the flow of material through the skip into the drum and prevents clogging in the sub-hopper.

CURTIS-FORDSON AIR COMPRESSOR OUTFIT



CURTIS AIR
COMPRESSOR
UNIT



COMPLETE
OUTFIT

Sold as Complete Outfit or
Unit Can be Bought Separately

Fills A Much Needed Want

Here is just the thing contractors are waiting for—a portable air compressor unit that operates with any Fordson Tractor, making a complete self-contained outfit. Can be used on a hundred different kinds of jobs where a supply of compressed air is temporarily needed. An outfit that can be moved from job to job quickly by its own automotive power—no extra truck for pulling necessary.

50% More Service

The average contractor can easily get 50% more service out of the Curtis Fordson Compressor Outfit than from the ordinary portable compressor outfit, which is heavy, cumbersome, expensive and serves only a single purpose. It must be remembered that the Curtis Fordson has every quality of the ordinary portable compressor outfit plus the advantages of detaching the Fordson tractor and using it for all tractor purposes.

Wide Range of Uses

The flexibility of the Curtis Fordson Air Compressor Outfit is remarkable—ideal for the road contractor, structural steel field jobs, oil field work, telephone construction, well drilling, etc. Just the thing to supply air for jack hammer drills, paving breakers, riveting hammers, rammers and tampers, compressed air hoists, sand blasts, stone cutting tools, quarry tools, rivet forgers, clay and coal mining diggers, for pumping water, for washing autos and trucks, unloading tank cars, paint spraying, caulking pipe lines, etc. For city streets can be equipped with rubber tires.

Tractor Used Independently

When the Curtis Fordson is not being used as a compressed air outfit, the Fordson tractor can be detached and used independently for hauling, loading, moving or power-driving purposes. The coupling is simple—nothing to get out of order or misfit. The whole arrangement is sturdy and practical—the Air Compressor Unit can be attached or detached by anyone in a few moments.

Curtis Pneumatic Machinery Co.
1671 Kienlen Ave. St. Louis, Mo.

If You Now Have a Fordson

The Curtis Air Compressor Unit can be purchased separately. Used in connection with a Fordson, it opens new fields of work for the tractor and an additional source of revenue for you. You know the reliability of the Fordson—and you know the reputation and dependability of Curtis Air Compressors. The Curtis Unit is backed by 70 years' manufacturing experience, 27 of which have been devoted to the manufacture of pneumatic machinery, and our \$1,500,000.00 institution. So you take no chances whatever.

Reasonable in Cost

The Curtis Fordson Air Compressor Outfit can be purchased complete, tractor and all, from us, or the Curtis Compressor Unit can be had separately. Mail coupon for full particulars and prices.

1671

Curtis Pneumatic Machinery Co., St. Louis, Mo.

Gentlemen: Please send me full information, your proposition and prices on:

☐ Curtis Fordson Air Compressor Outfit

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IMPROVED MULTI-FOOTE MIXER WITH HERCULES MOTOR

A Model L Hercules motor on which the number of parts has been greatly lessened, standardized and made interchangeable, at the same time developing approximately 15 per cent greater power for the same size of cylinder bore, has been installed on the new model. The motor is mounted lower on the frame of the machine and on the same frame as the reduction gear case. The reduction case has been redesigned and mounted horizontally, and supported at both ends with both gears running in oil. Larger spaces also have been provided around the gears for oil circulation, to prevent overheating.

The drum rollers have machined tread surfaces, larger hubs with increased-capacity oil chambers, and larger bronze bushings. The roller shafts have been increased in size from $2\frac{1}{4}$ inches in diameter to 3 inches in diameter, and positive alignment has been secured by mounting both the front rollers on the same shaft, and both rear rollers on the same shaft, instead of separate shafts for each roller. The rear drum roller shaft is mounted on steel bearings attached to the upright frames. The front drum roller shaft also carries the two-drum driving gears, and is mounted on

steel self-aligning bearings with long bronze bushings. The front drum roller shaft revolves, but the rear drum rolling shaft is stationary. All four drum rollers are loose on the shaft.

All of the main driving gears are high-carbon steel with machine-cut teeth. One of the drum driving gears is made adjustable so that it can be set at any point to exactly line up and mesh with the large drum driving gear, insuring perfect alignment between the two drum mixer driving gears.

The frame construction has been greatly simplified and improved, as well as strengthened, by doing away with the crib framing and extending the top frame down to join the lower frame. This has made it possible to do away with a considerable number of parts, including the four and five box bearings.

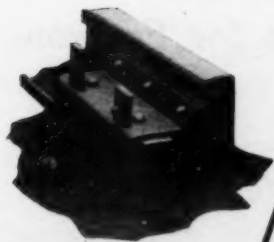
The manufacturers have given special attention to making all parts of the machine more easily accessible for adjustment, lubricating and cleaning. A larger use has been made of steel castings in all places where parts are subjected to strain and stresses, and of bronze bushings where parts are subjected to wear.

Our Front Cover Illustration

WE are indebted to the Baker Manufacturing Company, Springfield, Ill., for the interesting photograph of a dirt-moving train used by the R. F. Conway Company, of Chicago, illustrated on the front cover of this issue of *CONTRACTORS' & ENGINEERS' MONTHLY*.

The Conway Company used 24 Baker-Maney self-loading scrapers and nine 10-ton Holt tractors on this 53-mile hard-road contract in northern Illinois. The scrapers were hitched usually in

trains of four scrapers to each train, each scraper having a capacity of $1\frac{1}{2}$ cubic yards. One man handled the loading of each train. No teams were used on any part of the work. The trains of scrapers were stationed at various points along the route and were able at all times to complete the grade ahead of the rapid-moving mixer gangs. This job is described in more detail on page 81 of the November, 1924, issue of *CONTRACTORS' & ENGINEERS' MONTHLY*.



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What are the great problems confronting highway departments and contractors today?

What are the requirements of a road form to give best service?

What are the principal factors which have made necessary today's rigid road form specifications by State highway departments?

What have careful investigations by the United States Bureau of Roads shown relative to road surfaces?

These and innumerable other interesting questions are answered in this important paper read at the 1925 Chicago Road Show by Mr. Conner, State Construction Engineer of Raleigh, North Carolina.

Every state and county highway official and every road contractor will, by all means, want a copy of this treatise on smooth road construction and its many ramifications.

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A Trailer Dump-Wagon for Fordsons

Outfit Particularly Adapted for Use Under Elevating Graders and Steam Shovels

A DUMPING trailer wagon unit for attaching to Fordson tractors and built especially for use under elevating graders and steam shovels and for hauling sand, gravel, cement, concrete, dirt, ashes or rubbish, was exhibited at the Chicago Road Show by the Little Red Wagon Manufacturing Company, Omaha, Nebr.

The load is quickly dumped through the two bottom doors, which are released by pulling a lever. The wind-up is quick and works easily. The wagon wheels have 4-inch steel tires, and the axles are white hickory. The trailer, which weighs 1,830 pounds, carries $1\frac{1}{2}$ cubic yards level and 2 yards with sideboards, or $2\frac{1}{4}$ yards heaped with sideboards.

When dumped, the doors are on top of the load. The construction of the hinges, doors and chains is such that the doors swing free and do not



AN EFFICIENT DUMP TRAILER UNIT

bind on the load, an important feature which many contractors will appreciate if they have ever been stuck when using bottom-dump wagons. The only pull required after the load is dumped is the pull of the wagon off the load.

A Seven-Foot Rotary Scraper

Scraper Operating Without Wheels Is Controlled by Rope from Tractor Driver's Seat

EVERY new device in the dirt-moving field is of interest to contractors, as there are few projects which the general contractor undertakes that do not require more or less grading. The Reynolds rotary scraper, made by the Killefer Manufacturing Company, Box 179, Huntington Park, Los Angeles, Calif., is said to work as fast as a tractor can travel. No stopping or backing is required to set it in a loading position.

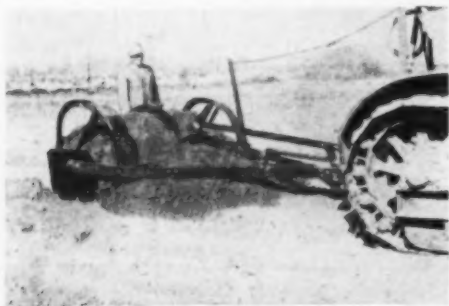
One of the interesting features of this rotary scraper is that there are no levers or projecting devices near the tractor driver. This makes it possible for him to climb banks or go down into gullies and yet be safe from the scraper at all times. He can also turn as short as the tractor can operate, without endangering his back, as the only operating connection between the scraper

and the tractor is a rope, and this rotary scraper can be backed up when it is desired to begin cutting close to a bank or levee. The hitch is stiff and well-braced, and the blade begins to cut immediately when the bowl rotates from the idle position. The frame of the scraper is of high carbon steel.

Control and Operation

The rope controls the cutting angle of the blade. An easy pull raises the blade to carry the load. If the rope is slacked on high spots the blade will cut again. If no more cuts are to be made, a full pull past center brings the blade edge off the ground to carry the load, and it is not necessary to hold the rope unless the driver wishes to cut and skip. A pull on the dump rope spreads the load gradually. Holding it for an instant dumps the load in a pile.

After dumping, the bowl rides high on its runners. When tripped, the bowl goes at once to its cutting position, the blade starting to cut without attention to levers or other devices by the operator. The load can be pulled to the edge of a hill or bank, backed and dumped over the edge, as this Reynolds rotary scraper will dump either backward or forward. This eliminates much hand work with shovels. By setting the stop to the rear of the control circle it is possible to spread the load thick; moving it forward allows the load to be spread out thin. A simple adjustment enables the blade to take deep or shallow cuts, according to the work in hand.



ROTARY SCRAPER UNIT IN ACTION



Highway No. 12—
Cologne, Minn.

Standard Asphalt Road Oil No. 4 Was Used

THERE are no city streets or country highways which, in beauty, long wearing qualities, economy and general excellence, can compare with those properly constructed of asphalt. However, funds are not always available for the building of such excellent roads and less expensive materials must be used.

Where this condition exists and where good, but low cost, streets and highways are desired, Standard Asphalt Road Oil is the product to which road commissioners and engineers naturally turn.

These asphalt road oils possess those characteristics which time and practice have demonstrated to be most desirable. Where they are used, the dust nuisance is immediately eliminated. This fact, coupled with the water-proofing effect of the asphalt road oil,

also puts an end to muddy streets. The application, year after year, builds up a remarkably smooth surface of great toughness and durability. The road to which Standard Asphalt Road Oil has been properly applied gives splendid service every day in the year.

With the great road building program mapped out for the country this year, there is certain to be a great demand for these products and those who delay making contracts may find it difficult to secure the products they want. It is advisable to arrange contracts now to cover your year's requirements.

Now, as always, the services of our staff of engineers attached to our Road Asphalt Department are at your disposal. Their services are rendered free of charge and the beneficiaries of it are placed under no obligation to us.

We suggest that you get in touch with our Road Asphalt Department at once, with reference to your requirements for 1925.

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Steel Traffic Treads Save Wooden Bridge Floors

Special Steel Plates Securely Fastened Used Extensively

ONE of the great troubles with metal bridges equipped with wooden floors is that traffic very quickly wears out the flooring along the lane traveled by vehicles. This may be overcome by the use of diamond pattern rolled steel traffic treads made by the Alan Wood Iron and Steel Company, Widener Building, Philadelphia, Pa. Because of the bridging effect of the steel treads, they reduce the impact load to a minimum, as it is spread over a larger area, and they provide an easy-driving surface which is neat in appearance and a protection against skidding because of the pattern and particularly lowers maintenance charges.

Installations of these rolled steel traffic treads have been made in 18 states in the Union and, according to the manufacturers, have given perfect satisfaction.

These plates are made $\frac{3}{16}$ -, $\frac{1}{4}$ - or $\frac{5}{16}$ -inch thick, measured through the body of the plate, exclusive of the design. The plates are 20 to 30 inches wide, or wider, depending upon the local conditions of the bridge, and are made from 12 feet to 18 feet 6 inches in length.

The plates are punched approximately every $12\frac{1}{2}$ inches on both sides, indicated as the long dimensions, and approximately every $5\frac{3}{4}$ inches along both edges by which the width is measured. Treads are fastened in the lines of traffic on a bridge by square-head lag-screws. The holes are located in such manner that the heads of the lag-screws fall between the raised diamonds, thereby allowing the head of the lag-screw to bear upon the flat surface of the plate, permitting it to draw the plate down to the plank and insuring a tight grip. In laying the plates, sufficient space is allowed between the ends to permit expansion.

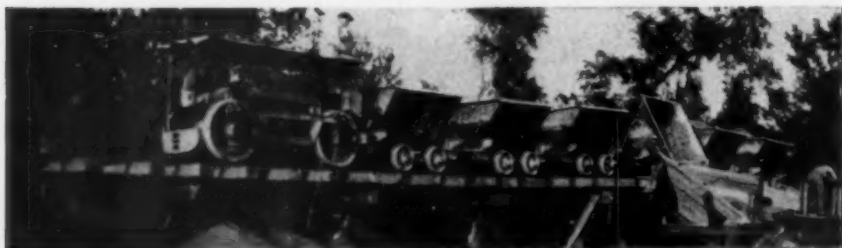
The lag-screws are $\frac{3}{4}$ -inch in diameter, have square heads, and are of sufficient length to reach



THE HAVRE DE GRACE-PERRYVILLE BRIDGE OVER THE SUSQUEHANNA RIVER, PROTECTED WITH STEEL TREADS TO SAVE THE WOOD FLOORING

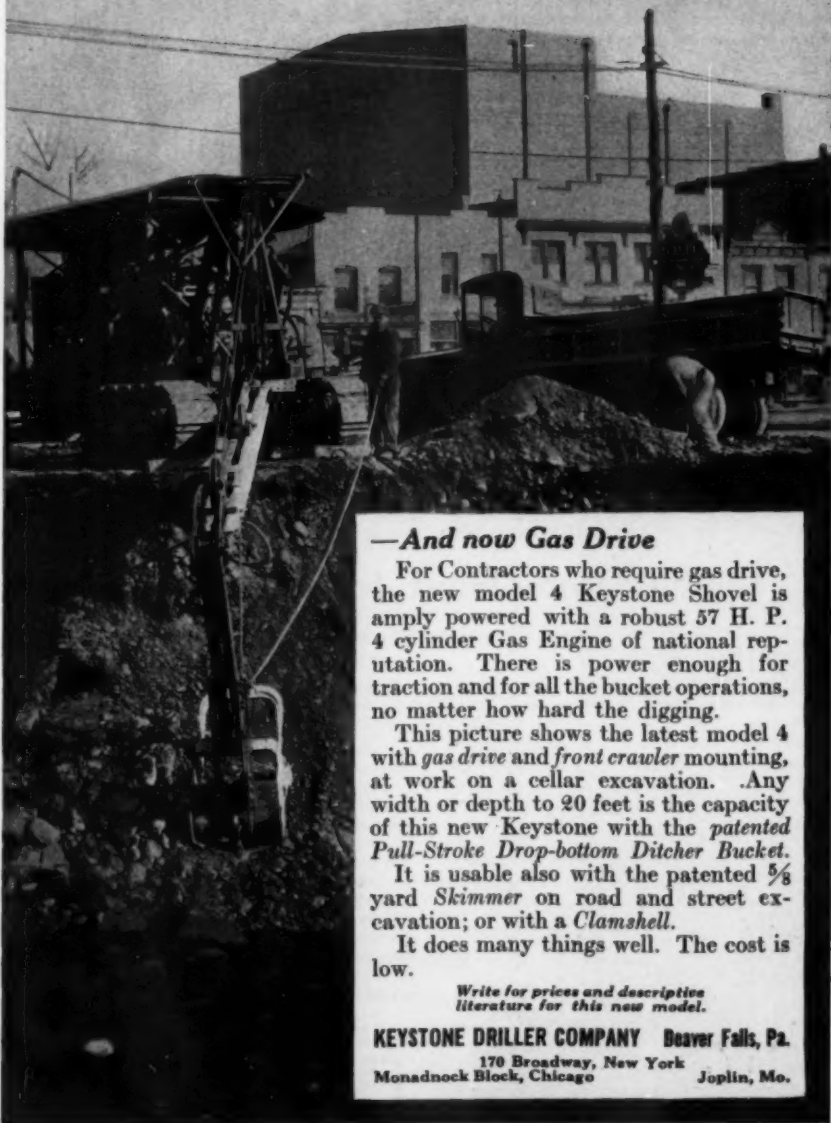
within $\frac{1}{4}$ -inch of the underside of the planking. This length is dependent on whether the bridge floor is of one- or two-course planking.

Before applying the plates, any inequalities in the planking which may fall under the surface of the plate should be smoothed off by adzing. The first plates at each end of the bridge should be bent down into the road-bed at right angles at least 3 inches, and, if required in addition, may be flared 1 inch in 4 inches. If possible, the plates should be fastened to the bridge structure itself at these points. It is advisable before applying treads to coat the underside of each plate with some bituminous material, and the planks covered by the treads should be painted with two coats of creosote oil.



ADAMSON-FORDSON INDUSTRIAL LOCOMOTIVE HAULING CARS TO DUMP FOR U. S. CAST IRON PIPE CO.

Keystone GAS Shovel



—And now Gas Drive

For Contractors who require gas drive, the new model 4 Keystone Shovel is amply powered with a robust 57 H. P. 4 cylinder Gas Engine of national reputation. There is power enough for traction and for all the bucket operations, no matter how hard the digging.

This picture shows the latest model 4 with *gas drive* and *front crawler* mounting, at work on a cellar excavation. Any width or depth to 20 feet is the capacity of this new Keystone with the *patented Pull-Stroke Drop-bottom Ditcher Bucket*.

It is usable also with the patented $\frac{5}{8}$ yard *Skimmer* on road and street excavation; or with a *Clamshell*.

It does many things well. The cost is low.

Write for prices and descriptive literature for this new model.

KEYSTONE DRILLER COMPANY Beaver Falls, Pa.
 170 Broadway, New York
 Monadnock Block, Chicago Joplin, Mo.

A Replacement Radiator for One-Ton Trucks and Industrial Motors

A Heavier-Bottom Tank and a Reinforced-Top Tank Are Features of New Unit

A GREATER cooling capacity, uniform dependability and quality construction are features claimed for the new Perfex radiator, which has been developed as a replacement radiator for the Ford truck and also for industrial motors in contracting service. This radiator, made by the Racine Radiator Company, Racine, Wis., has a new top tank made of brass with the reinforcement, splashers and other parts also made of brass. The material is heavy-gaged, reinforced inside where the castings are riveted in place, and strengthened with large reinforcing impressions, both front and back. The new bottom tank of this radiator is still heavier. It is seamless, drawn of one piece of material, and is reinforced with heavy brass reinforcements at each end. In addition, the bottom is rounded, giving added strength with which to stand the strain imposed by the weight of the water.

The special features claimed by the manufacturers for this radiator are its one-piece construction and full water capacity with no space taken up by face grill work or inside joints. The core is guaranteed not to burst from freezing. The curved wall gives large cooling capacity in small space. The projections keep the water turning and stirred up so that all of it touches the radiating surface for quick cooling. The bronze aerating wings have metallic contact with the walls for the full depth of the core, thus hastening cooling. A clear, unobstructed air passage keeps the aerating wings always cool. The cooling surface is full depth from front



FRONT VIEW OF A RACINE RADIATOR

to back, giving a total depth of water for a given depth of core. There is no seam in the front. Each tube is one piece with the ends joined at the back by a hooked lock seam, solder-sealed inside and out. The unobstructed air passage leaves no place for mud, dust or dirt to lodge and stop circulation.

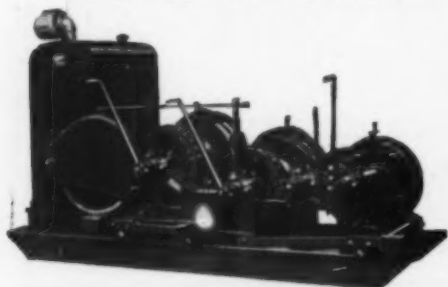
Double-Drum Hoist for Contractors

Effective Outfit with Two-Speed Reversing Sheave Attachment

A DOUBLE-DRUM contractors' hoist of the single-speed, non-reversible type, or with an attachment which gives two-speed operation in either direction, has been placed on the market by the Novo Engine Company, Lansing, Mich. The single-speed, non-reversible type is powered with Novo one, two or four-cylinder industrial engines varying from 8 to 18 horse-power. This unit is capable of handling loads up to 3,000 pounds, so that it is large enough to use on small construction

jobs and small enough to be used as an auxiliary unit on big projects.

The reversible two-speed rope sheave unit, which is a separate self-contained attachment, operates independently of the drum, so that the hoist can be used to run a double-platform elevator and at the same time handle two hoisting lines for hoisting other materials. The Novo LH hoist is said to be the only one on the market that has this feature. The two-speed sheave attachment can be mounted in the field or in the factory on double-drum LH hoists without additional drilling or machining. It is attached to the skids in front of the drum and is gear-driven from the drum shaft. Separate clutches operate the sheaves in either direction of rotation. It is provided with ratchet, dog and conveniently placed foot-brake and friction lever.

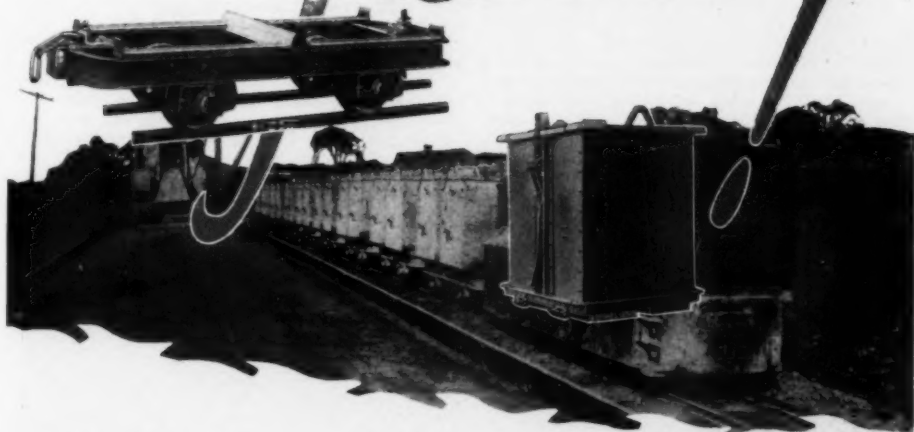


NOVO DOUBLE-DRUM HOIST WITH TWO-SPEED REVERSING SHEAVE ATTACHMENT

Beckwith Now Represents Smith in Philadelphia

THE T. L. Smith Company, Milwaukee, Wis., has announced that the Beckwith Machinery Company, Brown and Frost Streets, Philadelphia, Pa., is now representing it in that city. The Beckwith Company also has offices in Pittsburgh and Cleveland and represents the T. L. Smith Company in those cities as well. Beckwith maintains a full warehouse stock of mixers and parts.

Faster!



Profits Depend to a Great Degree on Speed

Contractors and road builders have found that Koppel cars and batch boxes—properly designed, built and reinforced—are important and necessary aids to efficient, clean, satisfying work.

We maintain at Koppel, and also at New York, Chicago, Pittsburgh and San Francisco an experienced staff of sales engineers who, without obligation, will be glad to co-operate with you and give you the result of their many years' experience in this field.



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Building a City of 7,000 Population in 27 Months

Real Estate Development of Interest to Contractors

TWO new ideas in real estate development are involved in the Brightmoor project of the B. E. Taylor real estate organization in Detroit. One is a merchandising idea; the other concerns construction, but the former could not have had the phenomenal success it has had if the unique method of standardized construction had not proved feasible.

Both these ideas were evolved from Detroit's need for a working men's subdivision. The Taylor company recognized that there are thousands of wage-workers in every large manufacturing city who are interested in homes but cannot "swing" even the ordinary \$5,000 to \$7,500 subdivision proposition. So it planned a subdivision in which a house and two lots could be purchased, on the easiest of terms, for \$2,000.

That this analysis of the market was sound is proved by the fact that from July, 1923, to April,

At one time, during the peak of the summer season, there were engaged on this job 32 carpenter gangs, 4 painting gangs, 3 paper-hanging gangs, 2 plumbing gangs, and 20 men digging trenches for the plumbing work. It is interesting to note that the company found it an advantage in its sales work to have these operations going forward while prospects were visiting the subdivision.

Mr. Magoon, in describing this project, made the following detailed statement:

"Economy in construction is our keynote, but this does not mean cheapness in the sense of weakening the structure, shortening its life, or depreciating its real value. It just means simplified construction.

"Our system enables us to put 4 x 8 units of Sheetrock on the walls and partitions with a minimum of cutting and of waste. This saves



VIEW SHOWING TYPE OF HOUSES IN DEVELOPMENT

1924, 1,500 such homes were built and sold. This season 1,000 more have been completed, and Brightmoor is still expanding.

Under direction of W. A. Magoon, construction manager, the B. E. Taylor company developed a four- or five-room house with timber foundation and the usual single-frame construction. The house has double floors, the first being laid diagonally, then covered with tar paper and oak flooring. The roof is of asphalt shingle. Instead of sheathing, tar paper is run from the ground back of the skirting, and is covered with 7/8-inch patent siding. The houses are of numerous designs and are arranged so that other rooms can be added at a minimum of expense.

They are built by gangs of from three to eight men. Contracting carpenters are engaged to do all the construction. Plumbing, painting, papering and electric wiring also are sublet to contractors. All material is furnished by the construction department of the Taylor company, and all houses must be built exactly according to blue-print and specifications. Two payments are made to the contractors—one when the roof is on, the other on completion of the house. Through this system not one dollar of liens has been placed against the entire program.

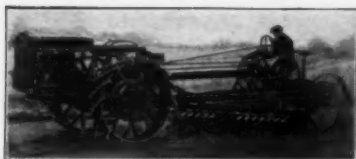
time and expense, and is one of the high lights of simplified, efficient construction which make this project possible.

"When one of these houses is completed, the trimmings can be carried away in a wheelbarrow, and the surplus nails in one's pockets.

"Number one material is used throughout—Sheetrock fire-proof wall-board, the best quality of paint, wall-paper as high as 50 cents a single roll, Humphrey sinks, Lambert water-meters and three-quarter strong lead pipe with Mueller fittings. Some of the special features are: electric fixtures throughout; all rooms papered; kitchen walls tinted; purchasers given choice of paints and wall-paper; windows hung with shades; cupboard and drop-shelf installed in each kitchen; Yale locks on outside doors.

"Our contractors' prices are low on account of the quantity production and because no time is lost in waiting for materials. Contractors are given from two to five houses at a time, so that the frames can be put under roof and work continued during rainy weather."

Sheetrock, the fire-proof gypsum wall-board manufactured by the United States Gypsum Company, has played a large part in the success of this project. Each house requires 1,540 square



Shawnee

"Thirty" Grader Cuts Your Fine Grading Costs in Two!

THE Shawnee "Thirty" Grader does more than combine the work of tractor, grader and scarifier. One man and the Shawnee "Thirty" can handle every grading job a paving contractor ever encounters, *heavy or light*—nothing barred. The Shawnee is designed to do this and does do it.

On heavy grading, faster than 5 or 10-ton crawler type tractors. Its A-frame and blade mechanism maintains an exact cutting elevation in any soil. On finish grading between forms, it backs up at 3 miles an hour without turning round.

The Shawnee Profile Blade, for finish grading, conforms to the Bates Specifications, requires only one helper, and saves on an average of \$60 to \$100 a day in materials.

Drive wheels may be equipped with rubber lugs. The 1925 Shawnee is stronger and heavier than ever, insuring extreme durability.

Scarifier and Fresno Wings standard equipment. Rooter Plow and Profile Blade extra. Write for catalog or see nearest distributor.

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Model A C.



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Eighty-three direct MACK factory branches operate under the titles of, "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

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feet of this material, and a gang of three men is given about three hours to install it in each cottage. When this gang enters the roofed and framed house, two men start to put up the fuel-boards and the other cuts the pieces that need cutting and leans them near where they will be used. Then all three finish the installation together.

The carpenters are followed immediately by the decorators, who apply the Sheetrock finisher to the joints and nail-heads, and, as soon as this is dry, the paperhangers are there to complete the rooms. The wall-board is supplied by the manufacturers in such sizes that all these operations can be performed with a minimum loss of time and a minimum of waste material.

Sheetrock has proved an advantage, too, on the sales side: its fire-proof quality, structural rigidity and permanence are stressed in the selling of the homes. Insulation is another point that is "played up." Each house is designed to be heated with one small stove, and the experience both of comfort and of economy in fuel cost, of those who occupied the dwellings last winter, has been an element of success in continuing the development this year.

Brightmoor was totally undeveloped when the Taylor organization took it over. It has been necessary, while building has been going on, to

pave sidewalks, gravel and cinderize roads, install electric lights, plant trees, build bridges and put in a complete water system. Water is supplied by the city, through mains laid by the construction department of the operating company.

As yet no sewage system has been put in, and transportation has not followed population to this subdivision. But the latter problem is partly met by the fact that automobile ownership is so general in Detroit. Private ownership of cars is supplemented by a bus system operated by the Brightmoor Transit Company, which is backed by the Taylor organization.

Four schools were built last year; a fifth—a \$157,000 brick structure—was opened last month, and the site for a sixth has been marked out. A community hall has been functioning from the outset. Under the auspices of the Brightmoor Improvement Association, picture-shows, dances, baby clinics, domestic science courses, card parties and lectures are given weekly. Two parks, a public playground, a ball field and a skating-rink are provided, as well as a model health center under supervision of the Red Cross.

Interest in this project, on its merchandising side and its construction system as well, has been shown by building and contracting firms as well as architects all the way from New England to San Francisco.

A Two-Batch Road Truck

Special Construction Gives Low Center of Gravity and Minimizes Side Sway

A TWO-BATCH truck known as the K-41-T unit, has been placed on the market by the General Motors Truck Company, Pontiac, Mich., especially for road work. This truck has a wheel-base of 127 inches and is equipped with 32 x 6-inch pneumatic tires in front and 36 x 8-inch pneumatic rear tires. This small-diameter tire gives the truck a low center of gravity, which is desirable, since it minimizes side sway. In designing this truck, the engineers had in mind the various things which a road contractor requires for his transportation equipment. The road contract is short at best, so that speed where road and grade conditions will permit is a vital factor. The contrac-

tor's ideal truck should also have super-pulling power to take care of the soft ground, mud and steep grades—all this, of course, without heating the engine. Accessibility, to facilitate repairs, is equally important, since the contractor is oftentimes a long distance from his base of supplies. Every wearing part of the motor on this truck is quickly and easily replaceable, even to the cylinder walls. With the ordinary type of construction, a scored cylinder means at least several days' delay and a high repair cost. A scored cylinder in this GMC motor is easily taken care of in a couple of hours and at a slight expense.

The truck is equipped with GMC two-range transmission. This allows the truck to speed up where road and grade conditions will permit and at the same time to have additional pulling power available when in bad going. By shifting into low range, the extra pulling power is there when it is needed. It just means that there are a couple of extra mule teams available when they are required. To accomplish this, only three additional standard parts are added to a standard transmission. By virtue of this two-range transmission, it is possible to use a moderate-sized motor and still have ample power. This makes for economy in gasoline and oil consumption.



ROAD CONTRACTORS' TWO-BATCH TRUCK EQUIPPED WITH GRADER BLADE



United

MOTOR TRUCKS IN ROAD CONTRACT SERVICE



THE United "Constructor" is a high speed, single batch unit, designed and built for road contractors' work only. Every detail of its construction is chosen to meet the exacting requirements of this service.

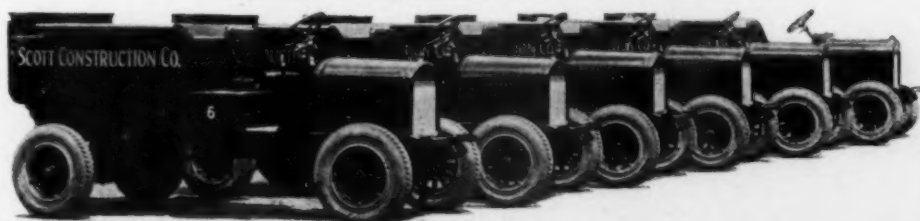
There is no better Contractor's Truck Built than the United "Constructor"

The test of actual use under the hardest conditions has proven this true. Owners of United fleets are unanimous in their praise of the performance, dependability and low operating cost of the United.

Buyers of road building equipment should be interested in some of the records made by the United through a season's use. We will gladly furnish these on request.

United "Constructors" are built for one job, sold for one job and serviced on United's exclusive "Instantaneous Service Plan."

United Motors Products Co., Grand Rapids, Mich.
Quality Transportation Units Since 1910.



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Price \$1881.00

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contractor. Our entire organization thinks, plans and works to one end—that Jaeger “Tilting-Drum” Concrete Mixers shall be “the first and last word” in concrete mixing efficiency and economy. How well we have succeeded is evidenced by *the thousands of contractors who now use Jaeger Mixers—on every type of concrete construction!*

Jaeger now manufactures six sizes of concrete mixers—and thirty-six different models. We show on this page the 10-L, the new ideal two-sack machine, and the 14-L for heavy duty on the largest construction jobs.

(Over 30,000 Jaeger Mixers have been sold since 1912.)

JAEGER has scored another big hit with the concrete industry! *Quantity production—greater factory efficiency—simplicity of design—huge purchasing power—and volume sales.* These are the factors that have enabled us to offer contractors the greatest possible values in concrete mixers. Our 1925 models and prices are the successful result of years of concentration in making but one line of machinery—*concrete mixers.*

This singleness of purpose has achieved great savings for every

The Original
JAE
Tilting -

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JAEGER MIXERS

AND THEIR PRICES

The big features of the Model 1925 Jaeger Mixers are:

1. Exclusive, patented Jaeger tilting-drum.
2. Exclusive patented loader.
3. Exclusive patented semi-automatic discharge.
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Every model has interchangeable wheels and can be equipped with steel, pneumatic or cushion tires. Each of them is backed by the Jaeger Guarantee of complete satisfaction. And when you buy them you buy not only a dependable, efficient machine but the service that this organization renders every purchaser.

Write us today for copy of our new 1925 catalog. With it we will send you the name of our distributor in your town. Have him demonstrate for you the superior advantages Jaeger Concrete Mixers offer you.

All tilting-drum mixers are not Jaegers. There are many imitations but only one original Jaeger Tilting-Drum Mixer. Why consider imitations when you can buy an original Jaeger Mixer for the same or less money? Look for the name of the drum and the flat spots inside.

The Jaeger Machine Co.

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GER

Drum Mixers

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WHO says so? Perhaps someone who just doesn't know what he's talking about or someone with his own ax to grind! . . .

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Remember too that the cheap price tag has always been the method of attack on *demonstrated* quality. *Price* can be attacked when *quality* can't!

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Paver Capacities—7, 13, 21, cu. feet of Mixed Concrete. Auxiliary equipment and choice of power to suit individual needs.

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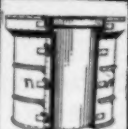
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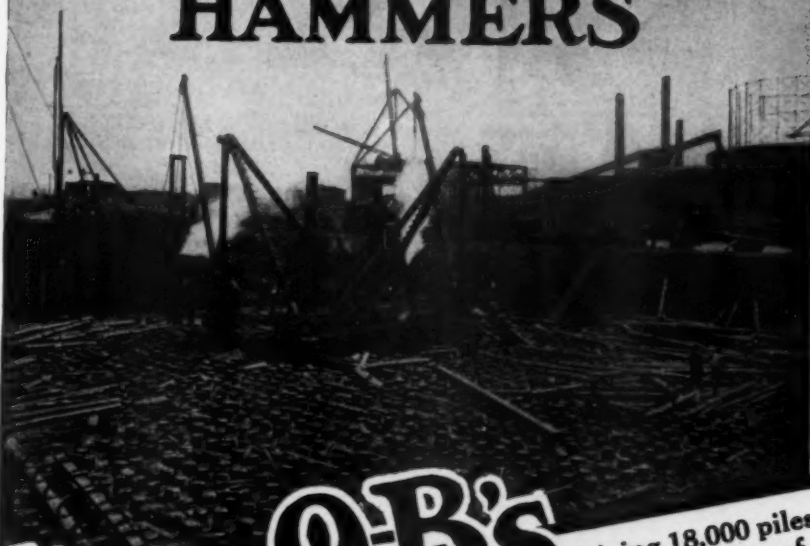
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Another big job for McKIERNAN-TERRY HAMMERS



Five 9-B's

driving 18,000 piles for
the foundation of the

New York Edison Power Plant

The work for this \$30,000,000 plant, at 14th Street and East River, New York City, is being handled by the P. T. Cox Contracting Company. It involves, at present, 18,000 wood piles, spaced 2-ft. 6-in. centers, driven as a mat covering two city blocks. Piles average 30 ft. penetration, the majority with points 8 in. to 11 in. diameter, with butts up to 16 in. The driving is very hard, into a dense, heavy mixture of coarse sand and clay.

We have been easily maintaining 50 piles per 8-hour day per hammer," writes the P. T. Cox Contracting Company. "We have found McKiernan Terry 9-B Hammers very satisfactory in every respect."

The equipment on the job consists of five 9-B Hammers, operated in two travelers with swinging leads, each operating two hammers; and one land rig. Note perfect condition of pile butts in photograph.
Bulletin 31 describes all McKiernan-Terry Hammers.

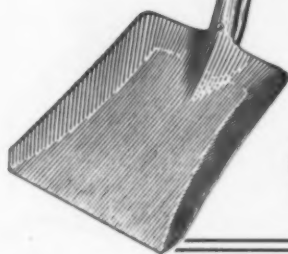
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Rock Drills Pile Hammers Lifting Jacks
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The Everhot Brand stays hot—it is being heated all the time it is in use, so branding is carried on continuously. Uses gasoline—obtainable at any gas station. The fuel is in the handle of the torch which can be carried and used anywhere.

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Grid-Iron-Grip Wheels will pull and fill a two-wheel scraper or an 8-foot grader with ease. They enable the contractor to use the Fordson the year round, in snow, ice or mud up to the hubs, without slipping. Two shoes on each wheel, flat on the ground at all times, give 480 sq. in. of traction surface. Crawler principle embodied in a wheel that lays its own track. Wheels are self cleaning. No reduction in usual speed of Fordson. Contractors are daily writing us of the remarkable economies which Grid-Iron-Grip Wheels have enabled them to practice. Would you like to know how you too can cut your overhead? Write today for complete details, specifications and prices.

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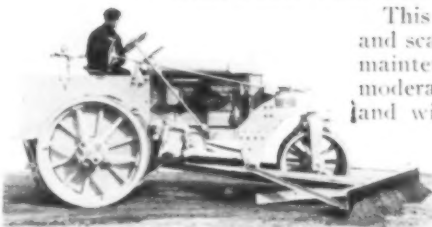
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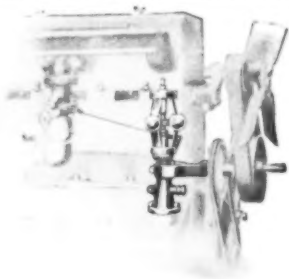


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The rugged construction of the Pickering insures continuous service, yet its responsiveness provides close regulation.

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There are now ten Ford trucks in this Company's fleet. Five are used to draw trailers; three are fitted with dump bodies for conveying sand; and the remaining

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Each unit averages fifty miles a day with a gas consumption of eight gallons.

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Auto Heater and Distributor PATENT COMBINATION

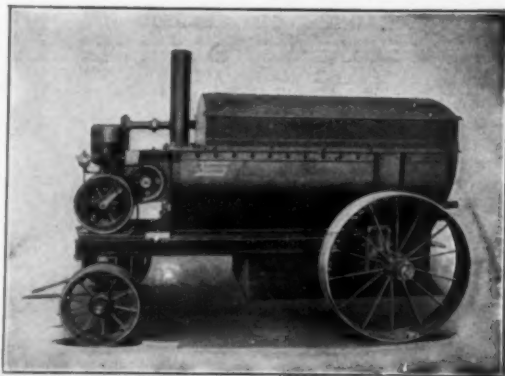


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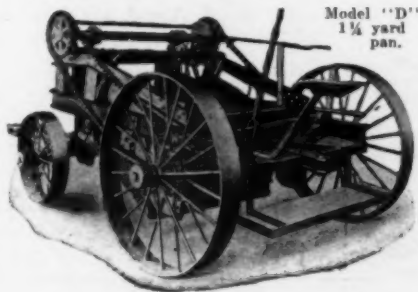
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Model "D"
1 1/4 yard
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The R. F. Conway Co. of Chicago successfully completed a 53 mile hard road contract on which the total dirt yardage, except blade work, was done by Model "D" Baker Maney Scrapers. There were 33 less men than if done the ordinary way. No teams used at all. This motorized job attracted country-wide attention and demonstrated beyond a doubt that Baker Maneys are the ideal teamless dirt movers. Speed and low price per yard with quantity results—that's what it means to motorize with "Maneys."

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Self Loading Scrapers

The Kwik Mix No. 5L mixer is a one bag machine equipped with side loader and water tank.



Get our latest circular covering specifically the advantage of this mixer.

Kwik-Mix CONCRETE MIXER

The Mighty One-Bag Tilting Mixer!

Get the most from a One-bag Tilter by getting the Kwik-Mix 5L Mixer. This husky, over-sized, powerful mixer is able to economically pour "heavy concrete jobs" where one-bag mixers are required. It is a real buy.

Contractors are now using the Kwik-Mix 5L for heavy duty mixing such as pouring concrete for bridges, heavy foundations and flooring. Because it is compactly built, it can be put high up on scaffolding for heavy duty or in the basement for "clean-up" work.

The Kwik-Mix 5L has an over-sized mixing drum revolving on Hyatt Roller Bearings, four steel mixing blades, durable frame construction and dependable and surplus power.

The Kwik-Mix Concrete Mixer Co.

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10 to 1000 Gallons Capacity Carried in Stock. Style P-1 Oil Burning Patrol Patching Heater is used for heating small quantities of tar, pitch, asphalt or bituminous filler as used in connection with asphalt brick and granite stone or wood-block paving. This outfit heats twice as fast as one with a wood fire, and is particularly useful in city streets as it burns without smoke and leaves no hot ashes on the pavement.

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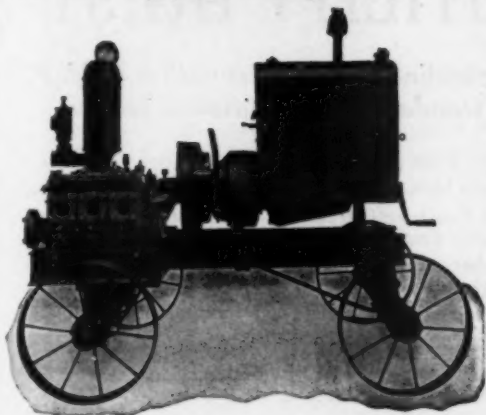
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Those who have thus analyzed their log records of costs and causes of delays decide to no longer use makeshift pumping equipment but resolve to use "DOMESTIC" TRIPLEX UNITS.

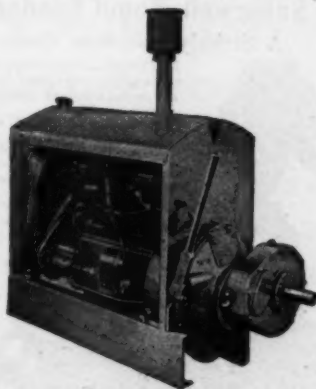
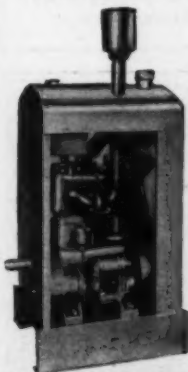
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is built to stand hard, continuous usage. Is furnished so that it can be easily applied to any Industrial equipment. Let us tell you why TURMO Power Plants are superior.



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Duty: Rope pull 2,500 lbs. at 150 f.p.m.

Drum: 10-in. dia. body; 18-in. face, 20-in. dia. flanges.

Unit Construction: Second drum unit can be added any time.

Clutch: Friction clutch between engine gear and hoist gear so engine turns over easily when starting.

Complete Hoist: Self contained unit complete on strong cast iron bedplate, mounted on heavy skids.

**A Real Hoist, Not a Makeshift Combination
Engine With Hoist Parts**

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Full length all steel creeper tread track giving over 1500 sq. inches of bearing surface. Suitable for all soil conditions.

Two digging speeds, 30 and 4 ft. per minute. Two traveling speeds $\frac{1}{4}$ to $2\frac{1}{2}$ miles per hour. Heavy manganese steel ribbon screw feeding device 8 ft. long mounted on 3-3-16 in. steel shaft.

Digging position quickly and easily adjusted and in new models absolutely controlled by special grading shoe.

Also equipped with swivel chute. Write for literature and prices on Spearwell Loaders.

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SUPERIOR AUTOMATIC DUMP BODY

Automatically dump when loaded. Stiff leg holds body in dumping position until released by driver.



Patent applied for

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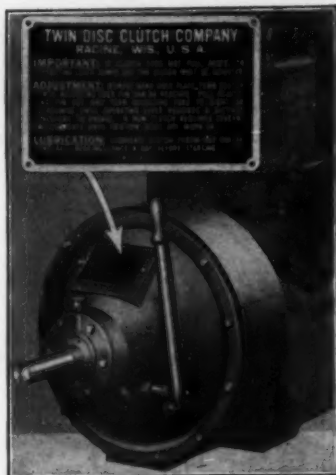
IT is small in size, but packed with useful ideas on how to save money in digging and moving earth and other loose materials. It may help you to solve some difficult problem. Write for it today.

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This contractor has found the secret of Twin Disc operating efficiency—correct adjustment constantly maintained. The patented lock pin feature makes adjustment easy. Full instructions for adjusting Twin Disc clutches are plainly etched on a plate securely fastened to clutch housing. By following these instructions daily the operator can absolutely do away with heating, slippage under load and wear of friction discs.

What is YOUR clutch problem? A line to our Engineering Department will bring you a satisfactory solution.

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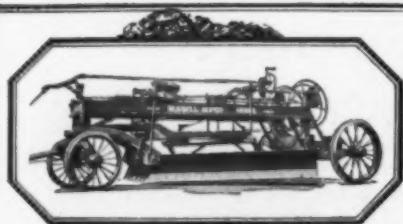
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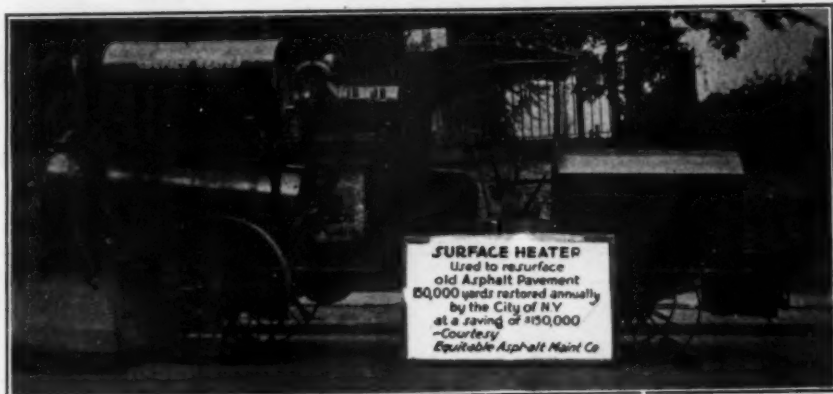
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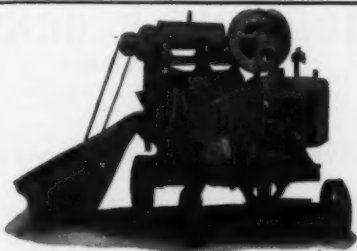
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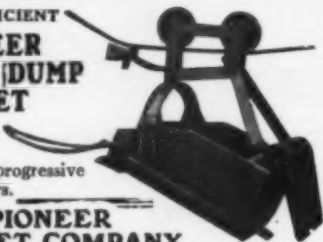


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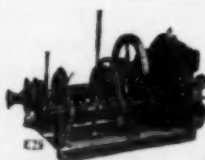


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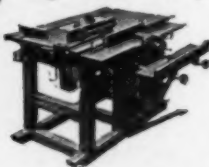
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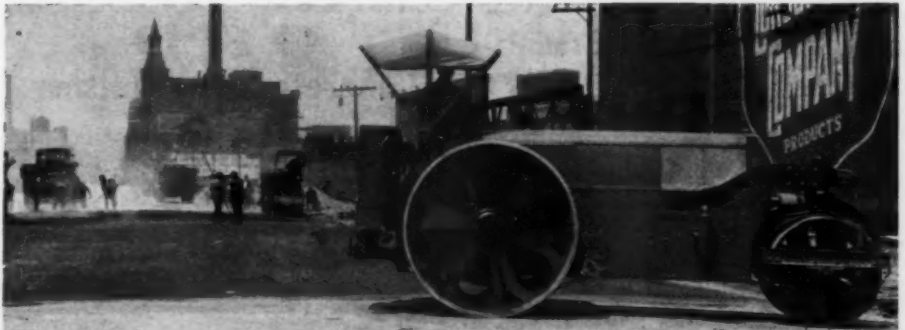
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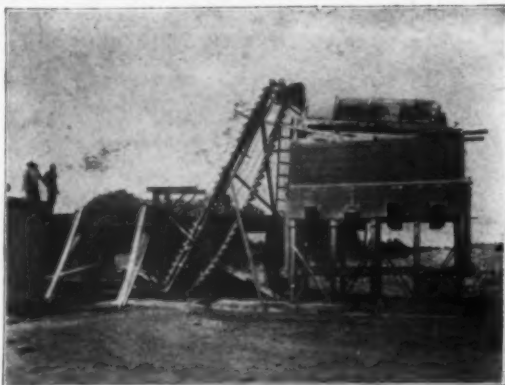
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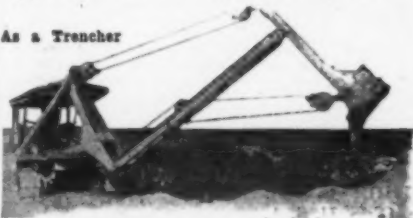


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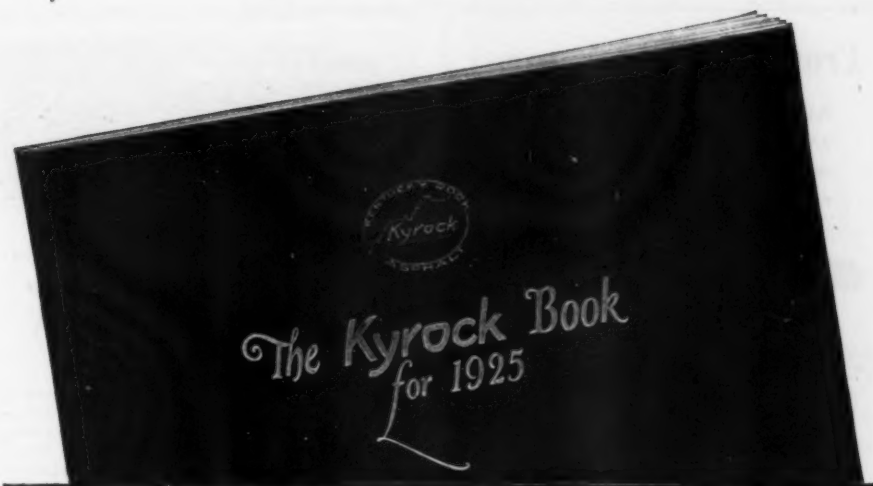
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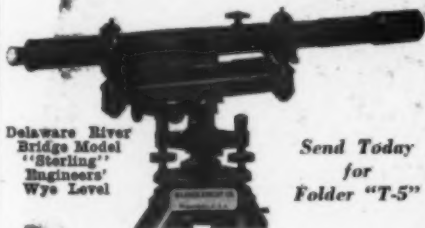
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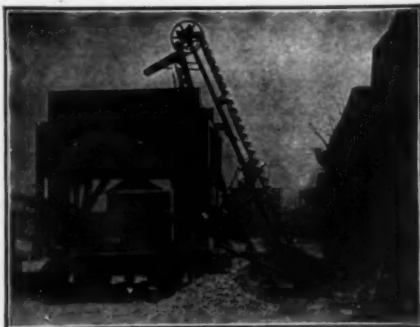
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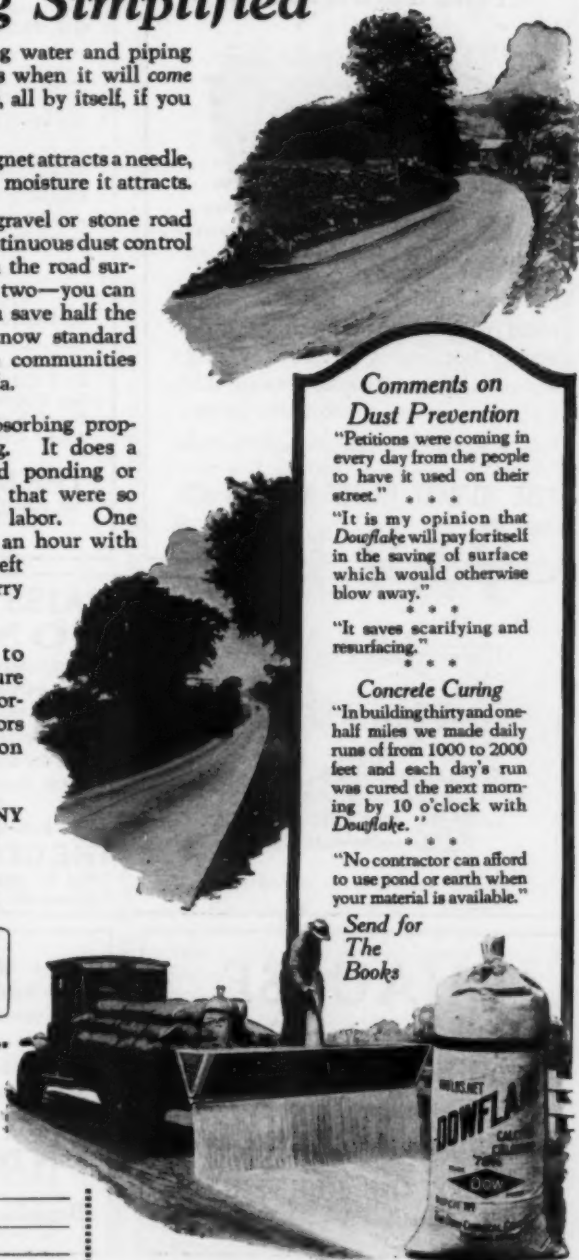
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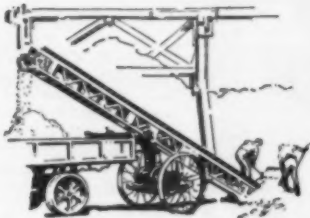
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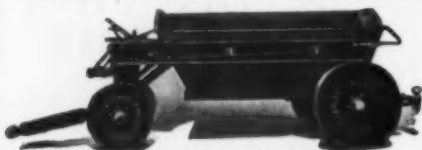
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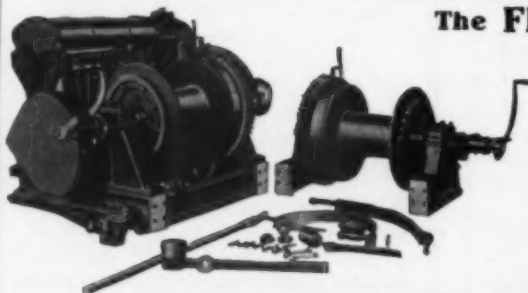
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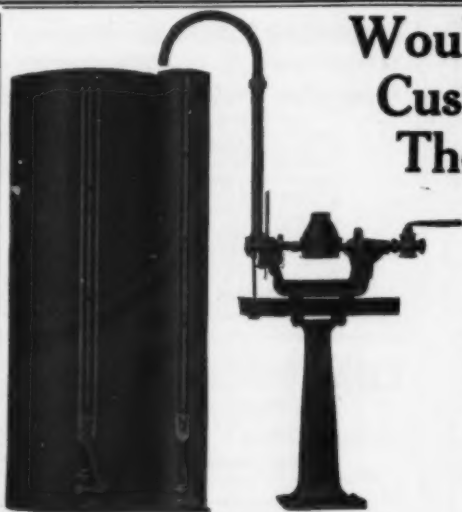
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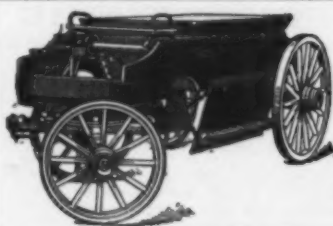
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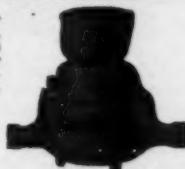
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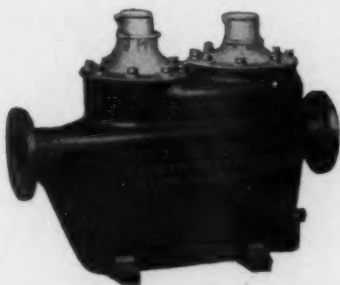
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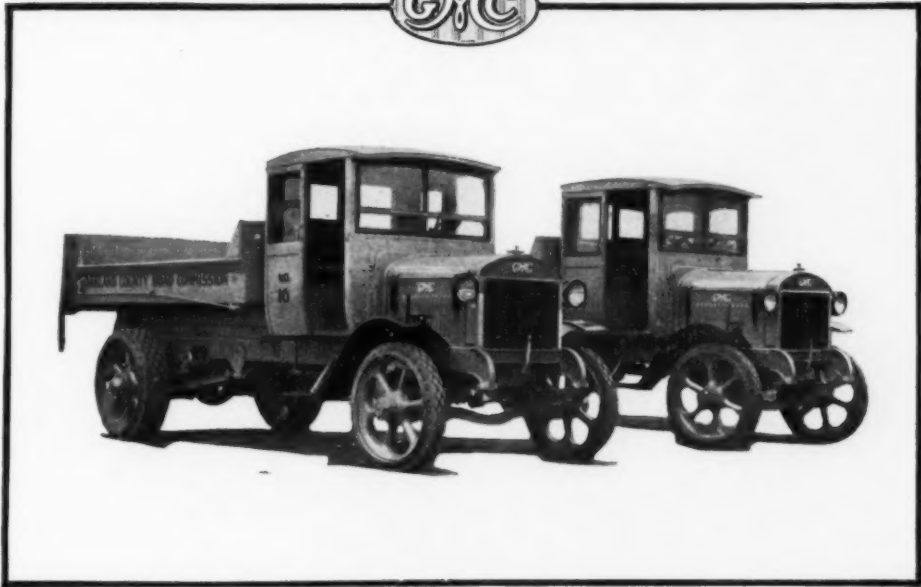
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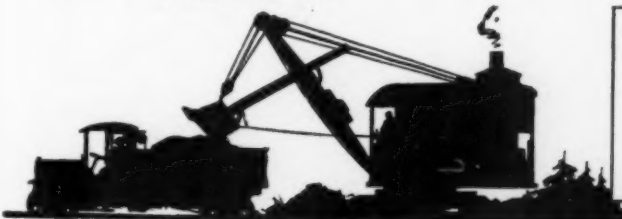
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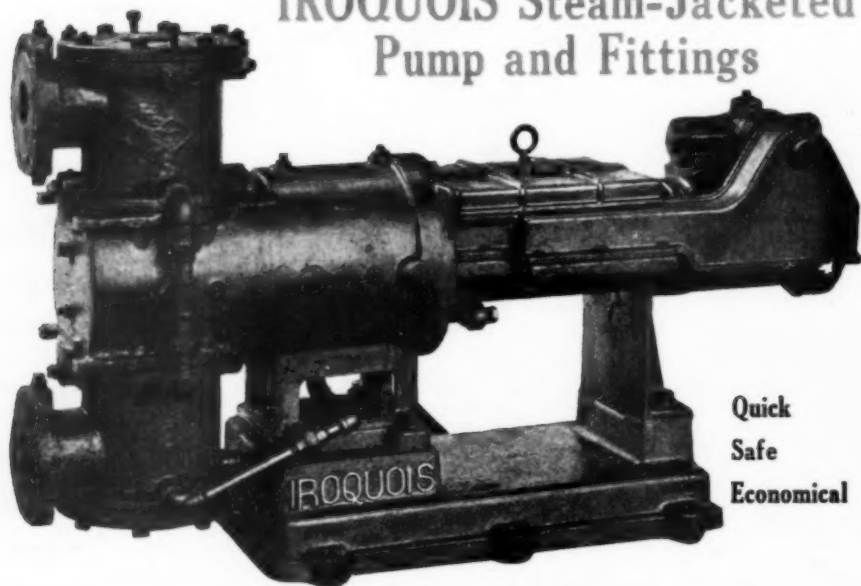


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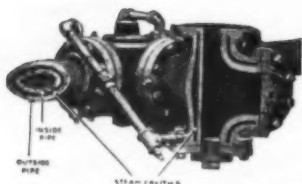
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